ANALYSING THE WELFARE IMPACT OF TRADE LIBERALIZATION ON AGRICULTURE: A STUDY OF RICE PRODUCERS IN VIETNAM

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Abstract

The impact of trade liberalization and economic integration reforms on agriculture have been the object of many scholarly efforts, studies, papers, and reports. However, they follow methods that appear to have inadequately anticipated the observed welfare effects. Investigations undertaken in this dissertation seek to help bridge the observed conceptual and empirical gaps.

Four main research investigations are focussed on. The first is the review of economic impacts of trade liberalization on the agriculture sector with a particular emphasis on welfare aspects. Second, the research examines how the effects of trade liberalization are distributed across stakeholders in agriculture, not only farm households and their welfare, but also related sectors. To do so value chain analysis is used in a case study of the Vietnam rice sector. Third, a seemingly unrelated equation model is used to capture welfare and poverty impacts of trade liberalization on Vietnam's rice sector. Lastly, the dissertation emphasizes that the impact of trade liberalization varies between regions depending on market exposure and societal arrangements, requiring greater attention from policy makers.

The research uses a combination of methods. The econometric model of a seemingly unrelated equation is employed to explore multi-dimensional poverty at farm household level. The value chain analysis is applied for sectoral analysis with implications drawn out at the national level. The use of updated data sets at household level, six waves of Vietnam Household Living Standard Surveys (VHLSS) from 2002 to 2012, allows the study to capture the recent impacts of trade liberalization on agriculture. The combination of value chain analysis and econometric modelling provide a comprehensive approach for investigating farm households' welfare and poverty in a transitional economy such as Vietnam.

The overall findings of the research can be summarized as follows. Given Vietnam is one of the world's main rice exporters, its rice farmers are expected to gain much from trade liberalization and significantly improve their overall welfare. However, the empirical studies carried out in this dissertation show that while trade liberalization benefits rice households welfare and poverty directly via the price channel it does not do so via the employment channel. Investigation of the value chain influences in the rice sector provides evidence of the presence of incomplete pass-through that explains rice farmers' diminished share of gains along the chain. These finding provide the basis for further research on channel and pass-through effects under trade liberalization.

Table of Contents

List of Figures

List of Tables

List of Appendices

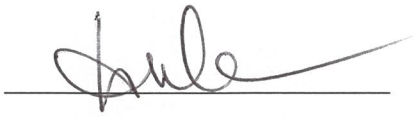
List of Abbreviations

ADB	Asian Development Bank
AFTA	ASEAN Free Trade Area
APEC	Asia Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
BTA	Bilateral Trade Agreement
CGE	Computational General Equilibrium
CIE	Centre for International Economics
CIEM	Central Institute for Economic Management (Vietnam)
EIAs	Economic Integration Agreements
EOIs	Export-oriented industries
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign Direct Investment
FE	Fixed effects
FTAs	Free Trade Agreements
G2G	Government to Government
GDP	Gross Domestic Product
GSO	General Statistics Office, Vietnam
GTAP	Global Trade Analysis Project
ICARD	Information Centre for Agricultural and Rural Development, Ministry of Agriculture and Rural Development, Vietnam
IFS	International Financial Statistics
IMF	International Monetary Fund
I-O	Input-output
IPR	Intellectual property right
ISG	International Support Group
MARD	Ministry of Agriculture and Rural Development, Vietnam

MFN	Most Favoured nation
MOIT	Ministry of Industry and Trade, Vietnam
MUTRAP	Multilateral Trade Assistance Project, EU-Vietnam
NAFTA	North American Free Trade Agreement
NTBs	Non-trade barriers
OECD	Organization for Economic Co-operation and Development
RE	Random effects
RTAs	Regional trade agreements
SAM	Social accounting matrix
SOEs	State owned enterprises
SURs	Seemingly unrelated regressions
TAs	Trade agreements
TPP	Trans-Pacific partnership agreements
TRQ	Tariff rate quota
UNEP	United Nations Environment Program
VFA	Vietnam Foods Association
VHLSSs	Vietnam Household Living Standard Surveys (from 2002)
VLSSs	Vietnam Living Standard Surveys (1992-93 and 1997-98)
WB	World Bank
WTO	World Trade Organization

Statement of Original Authorship

The work contained in this dissertation has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the dissertation contains no material previously published or written by another person except where due reference is made.

Signature: 

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Chapter 1: Introduction

1.1 OVERVIEW

Trade liberalization involves the elimination or reduction of restrictions on the free exchange of goods and services between nations. This liberalization removes or reduces tariff (duties, surcharges) and non-tariff arrangement (quotas, licensing rules, technical requirements, and others) which have been created to protect domestic production from foreign competition (Feenstra and Taylor, 2008, Krueger, 2009, Turner et al., 2008, Krugman et al., 2012). Trade liberalization is considered as a necessary step to achieve openness to trade and is the major driving force behind globalization (McCulloch et al., 2001, Feenstra and Taylor, 2008, Krugman, 1991).

Rapid increases in the flows of goods and services and foreign investment across national borders have been the most visible aspects of the increasing integration of the global economy in recent decades. However, whether trade liberalization is a welfare-enhancing process for all or not has always been the most contentious question of international trade research. Proponents typically emphasize the benefits of freer trade such as economic growth, improved market access or better resource allocation. In contrast, critics have blamed trade liberalization for negative effects including unemployment and wage inequality in advanced countries, increased exploitation of workers in developing countries, increasing poverty and inequality, and degradation of the environment (Lee, 2005). These views have been widely debated and raised issues that can be particular problems for small developing countries such as Vietnam.

Vietnam started its comprehensive economic reform in 1986 with the implementation of the 'Doi Moi' (Renovation) policy. This process involved domestic liberalization, movement from a centralized economy to a market oriented one, and the gradual opening of the economy to international influences. International integration and trade liberalization were characterized by a movement from an import-substitution policy to an export-promoting policy (Coello et al., 2010).

Accession to World Trade Organization (WTO) in January 2007 was an important milestone for Vietnam on the multilateral trade front. Vietnam also participated in other regional and bilateral trade agreements (RTAs and BTAs respectively). It joined ASEAN in 1995, made trade agreements through the ASEAN framework (including ASEAN's free trade agreements (FTAs) with China, Korea, Australia, New Zealand, and Japan) and signed a BTA with the USA (2001). This trend has continued with the conclusion of Vietnam-EU FTA and the Trans-Pacific partnership agreement (TPP) in 2014.

Vietnam is therefore actively entering the world market by opening its economy and seeking to use trade agreements to exploit the country's comparative advantage and to participate in international production and investment networks. Established literature has widely acknowledged that in the course of international integration and trade liberalization processes, there are both winners and losers within a country, and Vietnam is not an exception. Gains and losses distributed among different stakeholders in a sector, across sectors, and across geographic regions produce important policy issues. The further problem is what might be done to compensate those bearing excessive costs or risks. These are particularly so for the agriculture sector given its economic importance to the Vietnamese economy and the extent of its exposure increasing international integration and competition.

Research studies have attempted to evaluate the economic impacts of trade liberalization on Vietnam's agriculture. Most have anticipated country-wide impacts with the focus on macroeconomic indicators such as gross domestic product, trade flow growth, poverty, and government budget revenue. Only some have investigated the impacts of trade liberalization on farmer welfare. This research seeks to make a contribution to gaps in the existing literature by investigating the realised impacts of trade liberalization on agricultural production, trade activities and associated farm welfare and poverty effects. It will be found that linkages with other economic agents in agricultural value chains can provide insights into now-evident unexpected changes in welfare distributions, including some increases in farm household poverty.

1.2 CONTEXT AND MOTIVATION

Conceptually, there are several distinct schools of thought with distinctive approaches to the study of trade liberalization impacts. Lichtenstein (2016) distinguishes Mercantilist and Neo-Mercantilist, Classical, Neoclassical and Austrian, Institutional, Keynesian and Post Keynesian and Marxian Economics. Broadly, the central conceptual focus is on some preferred mix of specific nation, market, industry, government and interests. Each considers and seeks to explain trade impacts from distinctive vantage points involving different models. They share the concerns regarding gains and losses (or positive and negative effects) from liberalization process on an economy but differ in proposed ways of response.

Trade liberalization in the form of multilateral, regional, or bilateral trade agreements brings benefits of market access via commitments to gradually reduce and eliminate tariff and non-tariff barriers to trade in goods. Associated today are further agreements on trade in services, investment, intellectual property rights (IPR), and sustainable development. Dealing with existing economic problems and realizing ambitious development goals typically involves appropriate structural adjustment (including in supply chain) and a considerable improvement in the competitiveness of the economy.

The processes of trade liberalization and international integration create new opportunities and problems. Gains may come from more favourable market access, an influx of foreign investment, the spill over effects of technology transfer, and more advanced management skills. These factors may become driving forces for better economic growth, sectoral development, more efficient domestic resource allocation, improved living standards and poverty reduction.

At the same time, trade liberalization and international integration may also cause some negative socioeconomic impacts, especially in the short run. Left unaddressed, these can impose serious challenges to Vietnam's further development. NAFTA provides an example of short-run loss in terms of employment contraction being offset by long-run gain ins terms of productivity increases and greater product variety for customers (Feenstra and Taylor, 2008, Trefler, 2004). However, the USA explicitly recognised welfare effects and sought to lessen negative effects using Trade Adjustment Assistance (TAA) provisions. At my best knowledge, Vietnam has no such explicit recognition.

The transition from central planning to a more market-driven economy in Vietnam involves some rebalancing of market, industry, government and interests with an expectation that the nation gains. Indeed, the roles of each can change markedly and transitions can be uneven as changes occur. A clearer understanding of the direct and indirect impact of trade liberalization on the agricultural sector in Vietnam can be gained through an in-depth study into the performance and development of Vietnam's agricultural sector and the effects evident on farm household welfare.

While opening an economy may make the prospect of greatly increased agricultural exports possible, it also makes farmer's income more vulnerable to price fluctuations. Considerations of food security policies, farm income and export earnings are then part of this study as they each stimulate supply chains in distinctive ways. Moreover, the extent of price pass through can vary by region or organisational arrangement.

Rice is the most important staple food and also a political sensitive consumption good compared to other agricultural products in Vietnam (Pham, 2010). However, despite widely acknowledged achievements in rice production and exports since opening the economy, welfare benefits from trade liberalization seem to be not passed through in full to the rice producers as expected. Given the current government policies which face a trilemma of national food security, farmer income, and export earnings, the complexity of value chain and structures can unfavourably filter impacts to Vietnamese rice producers. My study, therefore, seeks to examine Vietnamese rice farmers' welfare and poverty under trade liberalization incorporating both value chain influences and such sectoral policy setting.

This research provides advisers, government and authorities with an improved basis from which to develop suitable policies for restructuring supply chains, directing the development of the agricultural sector and improving the empowerment and welfare of Vietnamese farmers. A better understanding is gained of the changes brought about by the impacts of liberalization and the ways in which greater benefits, risks and costs, have affected a key sector and Vietnam as a whole.

1.3 RESEARCH QUESTIONS

Four key research questions (RQs) are investigated in this study:

RQ1: How might the opening of an economy and trade liberalization affect different sectors?

RQ2: What are the sectoral and sub-sectoral welfare impacts of trade liberalization on Vietnam's agriculture in general, and the rice sector in particular?

RQ3: How are the welfare effects of trade liberalization distributed across stakeholders, particularly farm households, in Vietnam's agriculture?

RQ4: What are some implications for public policy in Vietnam?

To understand the theoretical possibilities and the experiences of others it is necessary to seek answers to RQ1. Addressing questions RQ2 "what?" and RQ3 "how?" involves an in-depth empirical evaluation of stakeholder welfare and conceptual investigations of supply chains with limited external linkages, pass through and other "imperfections" evident in Vietnam's regionally differentiated economy. Together these strands can help address RQ4 by assisting policy maker appreciation of the implications of increased openness, the potential needs of affected stakeholders (in sectors, regions and enterprises) and the challenges of sustainable economic development.

1.4 APPROACH AND ORIENTATION

In an attempt to assess the impact of trade liberalization on a developing country, Abbott et al. (2007) review more than two dozen recent studies of Vietnam's integration and trade liberalization. Most of studies reviewed in the research use Computational General Equilibrium (CGE) models as a tool to assess the likely impacts of trade liberalization on the economy. In fact, relatively few studies focus on assessing the realised impacts, particularly on Vietnam's agricultural sectors.

Studies of trade liberalization impact generally can be categorized by approach usage into four main groups, namely those using: (1) CGE models; (2) a sector-specific partial approach or partial equilibrium (PE) models; (3) qualitative analysis; and (4) *ex post* analysis using econometric methods.

Each approach has strengths and weaknesses. While the two market equilibrium models offer a consistent economy-wide framework for analysing trade policy question (Abbott et al., 2007) they have long been criticized for their limitations including that results are sensitive to strict assumptions, they can be manipulated to obtain desired outcomes (Rama and Le, 2005) and they are typically aggregated to a degree that can obscure important underlying relations (Abbott et al., 2008, Piermartini and Teh, 2005). Importantly here, full price pass through is typically simply presumed in market models.

Qualitative analysis is regularly criticised for its lack of comprehensive coherence and limited analysis. Details may have limited generalizability, especially if case studies are involved. However, possibilities can be indicated and interaction contexts considered. Econometric methods rely heavily on data and technical assumptions, but they can be used to distil important patterns "from the observed evidence". More fundamentally, the two market approaches involve developing *ex ante* expectations while econometrics relies on observations *ex post.* Qualitative analysis can provide an analytical bridge between the two via explorations of interaction possibilities and the influences that drive actual realisations.

Vietnam's agriculture, and the rice sector in particular, are transitioning under the impacts of various factors stimulated by liberalization. In the new environment, market rules may be "re-interpreted" along supply chains by various buyers or sellers. These and natural factors such as land and weather conditions "compete" with influences from government agricultural policies. The interaction of these factors is uneven in effect. The government role regarding national food security targets in Vietnam's rice sector has created market imperfections (from national price setting) while supply chain conduct (local price setting) can also distort the transmission of trade liberalization impacts (global price setting) to farmers. Alternately, three different price signals must be resolved in rice selling transactions. Impacts then vary.

Value chain analysis combined with empirical investigation are used to examine the distribution in Vietnam of losses and gains to agricultural stakeholders transitioning as a result of trade liberalization initiatives. This approach is complementary to prevailing methods in trade policy research on Vietnam's trade liberalization. The research presented in this dissertation can help bridge the current

knowledge gap and advance understanding of trade liberalization's broader economic impacts. Analysis and policy can be improved by taking into account the context of Vietnam as an economy in transition with distinct characteristics. Policy makers would then be more aware of welfare issues when negotiating and implementing trade liberalization commitments.

The dissertation's principal purpose is to identify and analyse the short-term impacts of trade liberalization on farmer welfare *following* Vietnam's international integration process during the years since 2000. Welfare impacts are investigated using microdata of household surveys undertaken during the transition of Vietnam to a more modern economy. It will be seen that imperfect transmission and regional effects, and rice value chain conditions do affect rice farmer welfare. An incomplete external price pass-through results from a variety of imperfections which filter and modify prices (and associated quantity effects) along a supply chain.

A result of this research is that the initial policy assumption that rice farmers in Vietnam would gain from trade liberalization receives only minimal support. While in the long-run they *might* gain if pass-through effect happens, welfare problems and increasing poverty are evident. Impediments along the supply chain have apparently filtered the expected positive welfare impact of trade liberalization on Vietnamese rice farmers. These findings have public policy implication: trade liberalization impacts not just from border measures but also from supply chain structure, conduct, as well as domestic policies arise.

Different literature streams, including international trade theory, value chain analysis, welfare economics and farm household schema are combined within a conceptual framework that allows investigation of the channel mix by which impacts are transmitted. A complementary mix of methods is used for analysing impacts. Each is designed to contribute to the existing literature and to support Vietnam's policy makers in the field of agricultural and national development.

The empirical chapter of this dissertation will provide estimates of the sectoral impacts of trade opening on key variables at both sectoral and household levels. A maximum likelihood estimate is applied to seemingly unrelated regressions (SURs) to provide a more robust assessment of the impact of trade-induced factors via price and employment channels on household welfare and poverty.

This study also uses the latest data from various iterations of the Vietnam Household Living Standard Survey (VHLSS) from 2002 to 2012 in order to quantify the impacts of trade liberalization on farm-households' welfare. Earlier studies on Vietnamese farmer and household welfare were necessarily based on data from earlier iterations, that is Vietnam Living Standard Survey (VLSS) 1992-93 and 1997-1998 such as (Nguyen and Tran, 2006, Benjamin and Brandt, 2004, Glewwe et al., 2002, Niimi, 2007, Dollar et al., 1998, Aksoy and Isik-Dikmelik, 2007, Justino, 2011). The use here of more extensive data allows for the capture of recent developments involving trade liberalization, policy interventions, and impacts.

1.5 DISSERTATION PARTS AND EXPECTED CONTRIBUTIONS

The research is reported in three main parts (with chapter numbers shown):

I. REVIEW:

2. An **overview** of Vietnam agriculture and rice sector operation will provide a background justify the approach that applied in the research.

3. A review of a range of **previous studies** of the relevant theories and examination of mechanisms for analysing trade liberalization impacts on Vietnam's agriculture sector in general, and on household welfare in particular, targeted at farm household group.

II. INVESTIGATION:

4. A **schema development** of farm household's operation under trade liberalization impacts.

5. A detailed **analysis of a rice value chain** to identify how welfare impacts are transmitted and distributed among stakeholders along the chain.

6. An **empirical analysis** with microdata at household level to investigate estimate the trade liberalization impacts on rice-producing households' welfare and poverty.

III. CONSOLIDATION:

7. An analysis of **policy implications** with respect to agricultural trade and sectoral development in Vietnam.

The flow chart in Figure 1-1 briefly illustrates steps, objectives and outcome pathway in part II and III. This flow chart presents a guide map for the whole dissertation in which focus on problem - solving of main chapters departing from research problem and objective identification and methodology application to get to the outcomes.

This research contributes to current understanding of trade liberalization impacts and agricultural economics in a number of conceptual and empirical ways. *Firstly*, the dissertation provides an applicable farm production framework which will be used as a platform for explorative and empirical analysis in agricultural economics in developing countries under trade liberalization. The farm production framework includes schemas will be applied to explain the different patterns of farm activities under trade liberalization of Vietnam's rice sector. In addition, the framework and trade liberalization impact mechanism provides implications for the regional impacts of trade liberalization will also be investigated in this dissertation.

Secondly, Rice Value Chain and rice policy setting will be analysed to provide a detailed picture of the production and marketing system in Vietnam's rice sector. The value chain analysis subsequently helps to identify how supply chain structure and policy constraints that have been considered the main hurdles for rice farmers to appropriate a greater share of trade liberalization benefits, which can be shown to improve their overall welfare. Furthermore, the essential role of intermediary activities in the rice value chain are evident, providing compelling reasons for the inclusion of value chain and regional differentiation considerations in the policy making process. The value chain analysis also contributes to expand the application of Winter's approach about trade liberalization impact.

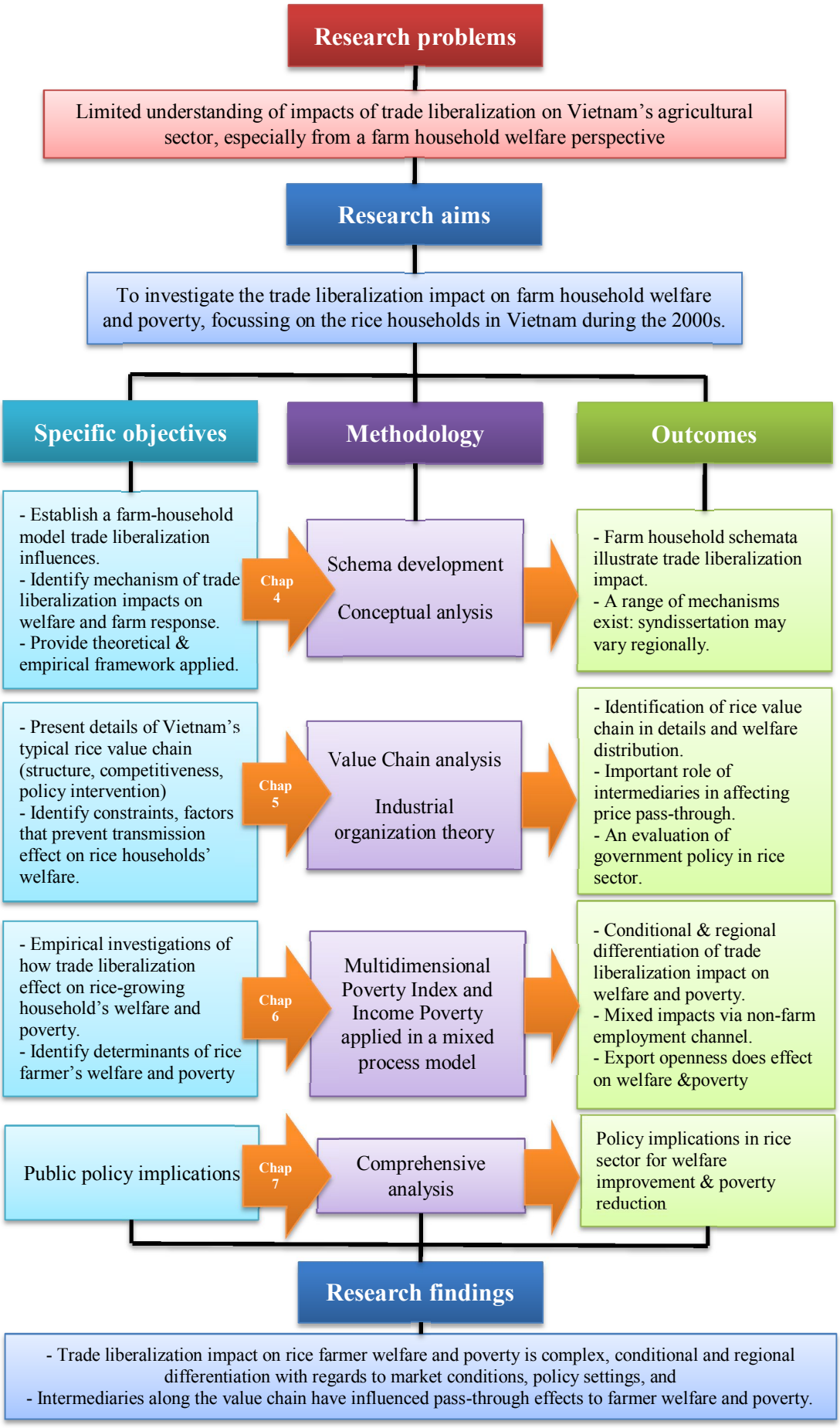

Figure 1-1: Research problems and outcomes pathway

Thirdly, given that literature on the impacts of trade liberalisation on farmers' multidimensional poverty is still relatively new, the dissertation has adopted a two stage econometric framework to assess empirical the pathways through which trade liberalisation could impact levels of multidimensional deprivation using household data sets. As explained in Chapter 6, the latent class modelling techniques are used in the first stage to classify the entire rice farming households into distinct groups given observed levels of consumption in many aspects of living standards. In the second stage, maximum likelihood estimation is used. Additionally, empirical models in this research test the effect of the provincial-level trade openness index - a proxy of trade liberalization - on rice farmers' welfare and poverty.

Fourthly, with regards to methodology contribution, the dissertation has selected an approach that is complementary to prevailing *ex-ante* methods of partial and general equilibrium in trade impact study. Our *ex-post* analysis emphasizes the realized short-term outcomes of trade liberalization on welfare in a fast-growth developing country like Vietnam. The qualitative analysis in supply chain investigation complemented by empirical regression models provide a more appropriate alternative approach to look deeper at welfare impacts of trade liberalization considering the imperfections of the market. A variety of relationships allow multiple links between export markets and farmers. Government, market, enterprises and other intermediates affect information, including price signals and the distribution of value chain. Constraints and incomplete pass-through revealed along the Vietnam's rice value chain provide value insides for policy interventions.

Fifthly, the overall findings of this research will provide implications to policy makers to implement agricultural development policies with regards to impediments that prevent the complete transmission of trade liberalization impact along a supply chain. Understandings of the welfare impact mechanism and factor influences in rice value chain can potentially be applied to several other agricultural product groups in Vietnam as well as other developing countries.

1.6 DISSERTATION OUTLINE

This dissertation is presented in seven chapters to address the issues of the welfare impact of trade liberalization on Vietnam's agriculture focussing on rice-

growing households. The research analysis is accomplished in the following structure.

Chapter 1 introduces the research problem, defines research questions and outline the research approach in this study.

Chapter 2 describes a general overview of the study context regarding Vietnam's economic development and agricultural sector under the trade liberalization process since the 1990s. Particularly, in this chapter, rice sector has been focused in both production and export and also the government's policy aspect to demonstrate its important role in Vietnam's agriculture.

Chapter 3 reviews relevant literature to provide a conceptual platform for the study. There are four main areas discussed in the chapter, in which review of approaches and ideas that have been widely used in trade liberalization research, welfare impact and value chain analysis are the main concerns.

Chapter 4 develops a farm-household framework that can represent influences on rice farm production in Vietnam by extending established theoretical household model. Methodologies for measuring trade liberalization's welfare impact and the model applied in the empirical chapters are also explored.

In a close linkage with Chapter 2, *Chapter 5* focuses to analyse the operation of rice value chain in Vietnam and how this can influence price pass-through and rice-growing households' welfare.

Chapters 6 empirically investigate and report how the welfare impact is transmitted, and what the determinants of Vietnamese rice households' welfare and multidimensional poverty were during the period from 2002 to 2012. These two complementary studies also attempt to create a link between the value chain analyses in the rice sectors with agricultural development policy considerations in Vietnam.

Chapter 7 first provides a brief summary of the dissertation with an emphasis on the main contributions. The chapter then highlights key findings and policy implications in addition to presenting the limitations and future research suggestions, before providing concluding remarks for the study.

Chapter 2: Vietnam's Agriculture and Rice sector in an Era of Reforms

2.1 INTRODUCTION

The main purpose of this chapter is to provide a general picture of Vietnam's rice sector and rice farmers under international integration process as an institutional background for latter value chain and empirical analyses. The chapter hence first describes Vietnam's economic reforms and integration process in section 2.2. Section 2.3 is follow with main economic contributions and also constraints of the country's agricultural sector during the reform process from the 1990s to the present. The rice sector with its vital role and characteristics under liberalization process is the focus of section 2.4. Detailed analysis of factor production in rice sector, of rice farmer characteristics as well as government policy that regulate the Vietnam's rice sector in relation to the liberalization and globalization process provide an institutional description of Vietnam's rice sector both at national and farm household perspectives. Outlined are the interlinkages of three key policy targets: (1) food security, (2) farmers' income, and (3) export earnings in considering sectoral production factor constraints.

2.2 ECONOMIC REFORMS AND INTERNATIONAL INTEGRATION

2.2.1 Country overview

Located in the Indochina peninsular, Vietnam is currently a low-middle income nation with a population of 87.84 million people and a GDP of US$ 124 billion (World Bank, 2011). The country ranks thirteenth among the most populous countries in the world, but is only the sixty-sixth largest in terms of land area[1]. The population density is high and heavily concentrated in the two fertile plains and food granaries of the country namely Red River and Mekong River deltas, which are connected by a long, narrow coastal strip as the map in Figure 2-1. The geographical advantage, which is close to major shipping routes and to the relatively prosperous and rapidly expanding East Asian economies - couples with a very long coast line

[1] CIA World Factbook, 2014.

(approximately 3,444 kilometres) ensures that most areas of the country enjoy a favourable access to transport to foreign markets (Van Arkadie and Mallon, 2004).

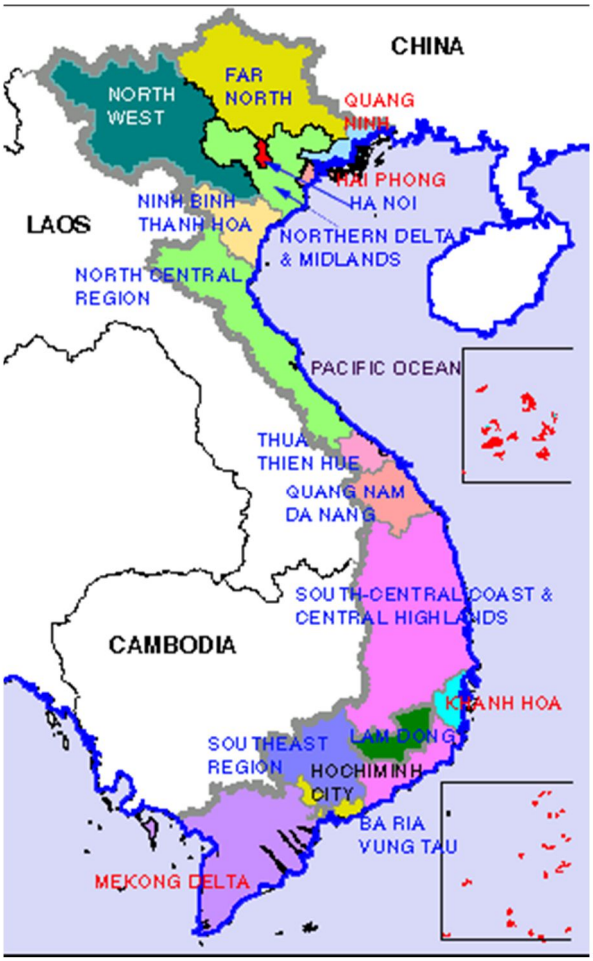

Figure 2-1: Map of Vietnam's regions[2]

After the government initiated the "Doi Moi" (Reform) campaign – a political and economic renovation – in December, 1986, Vietnam began a transition period from a centrally planned to a socialist-oriented market economy. However, prior to 1989, the country in fact still belonged to the group of less-developed countries in the world and was facing with serious problems following the opening up of the economy: hyperinflation, famine, drastic cuts of Soviet Union aid, and a trade embargo by the Western countries. The enactment of this opening to international trade and investment policy, which effectively started in 1989, set a turning point in the history of Vietnam's economic development (Vo, 2005). As a result, between

[2] Source: http://www.usvisatovietnam.com/vietnam%20regional%20map.gif

1990 and 2010, Vietnam's economy experienced high growth at an annual average rate of 7.3%, while the per capital income almost quintupled to around US$ 1,400 in 2011 (World Bank, 2012a). Other macroeconomic indicators (in Table 2-1 below) also illustrate a fast growing economy in terms of trade and investment during the period from 1991 to 2011.

Table 2-1: Vietnam's key macroeconomic indicators, 1991-2011

		1991	1996	2000	2005	2010	2011
1	Annual GDP growth *(%)*	5.96	9.34	6.79	8.44	6.78	5.89
2	Inflation, consumer prices *(%)*	-	5.67	-1.71	8.28	8.86	18.68
3	Total exports (Goods & Services) *(mil. US$)*	-	9,498	17,150	36,623	79,697	105,785
4	Exports growth *(%)*	29.86	24.00	21.10	17.78	14.65	14.50
5	Total imports (Goods & Services) *(mil. US$)*	-	12,334	17,325	39,358	87,294	109,215
6	Imports growth *(%)*	-6.36	21.30	16.61	14.18	14.11	14.07
7	FDI, net *(mil. US$)*	-	2,395	1,298	1,889	7,100	6,480
8	Export + import/GDP *(%)*	66.95	92.71	112.53	142.90	165.34	167.85
9	Gross savings *(% of GDP)*	-	20.42	31.27	35.78	31.86	30.55

Source: Author's compilation from World Bank's databank and Vietnam GSO's data.

2.2.2 Trade Liberalization Process

Vietnam's economic reform process since 1986 can be divided into two phases (Leung, 2010). In the first - the first decade of economic "openness" - economic growth primarily came from the creation of markets for agricultural produce and the expansion of agricultural land area. Agricultural exports (rice, coffee, rubber, tea, etc.) formed a substantial and increasing contribution to annual total foreign exchange revenue. Being able to sell produce at market prices provided the incentive for farmers to grow the right crops for the markets, while the introduction of long-term leases on agricultural land encouraged investment in infrastructure and capital equipment. Agricultural production soared as a direct result (Che et al., 2002, Dollar and Litvack, 1998, Leung, 2010). One salient characteristic of the trade reform process in this period was that the system of international trade and investment was

very much tilted towards protecting the state sector. Most foreign direct investment (FDI) (up to 99%) was in the form of joint ventures with state-owned enterprises (SOEs) (Riedel, 1999). The first phase closed immediately prior to the onset of the East Asia financial crisis in 1997-1998.

Although the effects of the 1997-1998 financial crisis were less severe on Vietnam than in other neighbouring countries such as Thailand and Indonesia, economic growth slowed in the first half of the 2000s and did not resume the pre-crisis trend of 8-9% per year until 2005.

The second phase of reforms included the enforcement of various laws[3] that created a better legal environment for equalizing treatment between state enterprises and the private sector, and between domestic and foreign firms (Bingham and Leung, 2010). This second phase also witnessed the acceleration of Vietnam's international integration process in terms of joining various trade agreements, at both bilateral and multilateral levels. A series of trade agreements in which Vietnam was as signatory member were initiated and concluded.[4] After Vietnam joined the WTO in 2007 the economic growth rate recovered and globally ranked second only to China's. However, expectations of sustained rapid growth with stability proved short-lived as macroeconomic turbulence erupted in 2007 in the form of real estate and stock market bubbles. Until mid-2010, the home-grown macroeconomic turbulence and the global financial crisis highlighted the limitations of the phase two reform strategy. In the increasingly globalized world of trade and investment, simply unleashing the domestic private sector was recognized as no longer sufficient to sustain high rates of growth (Leung, 2010).

Vietnam's trade liberalization and international integration process has been reviewed in a number of studies such as Auffret (2003), (Athukorala, 2009, Athukorala, 2006, CIE, 1998, CIE, 1999, MUTRAPII, 2008). Generally, the trade reform process in Vietnam is closely related to the country's efforts to ensure trading rights, protect domestic production, and create incentives for export promotion. In the process Vietnam's trade policy turned from an import-substitution policy to an export-promoting policy.

[3] Such as the Enterprises Law in 2001, the unified Enterprises Law and the Common Investment Law in 2006.
[4] See Table 2-8.

Before 1989, foreign trade activities in Vietnam was a state monopoly. State-owned corporations (SOCs) were only actors who had right to trade with foreign companies. Although conditions of entry for other non-state enterprises were progressively weakened since then, in fact still very restrictive (Vo, 2005). In 1998, the complete abolition of trading licenses has ended the monopoly position of SOCs in foreign trade representing a significant move forward in the country's trade liberalization process. Since 2001, private enterprises had the right to take part in any foreign trade activities, except trading commodities or items that were prohibited or under specialized management[5]. The number of enterprises registered for trading activities increased from 2,400 in early 1998 to about 18,000 in early 2004 (Vo, 2005). From 2002, further liberalization has extended to foreign invested enterprises (FIEs) who were granted the right to be involved in exporting goods other than those they produced. Competitiveness of more diversified enterprises therefore has pushed up the efficiency of foreign trade activities.

The liberalization process in the areas of trade policy and trade management also accelerated considerably during the second phase of reforms[6]. The non-tariff barriers (NTBs) such as quantitative restrictions and foreign exchange control (applied quite rigorously with the purpose of balancing domestic production, imported goods, and domestic consumption; protecting domestic production; and regulating consumption), have gradually been reduced and eliminated in accordance with Vietnam's trade agreement' commitments. The issuance of a trade policy roadmap for a 5-year time frame rather than yearly regimes resulted in a more transparent and predictable export-import environment. In 2001, most quantitative restrictions were abolished and replaced by the tariff structure, which conforms to the country's international trade commitments (for example, within the AFTA – ASEAN framework).

Vietnam officially became the 150th member of the WTO from 11 January 2007 and since then, the trade liberalization process has continued with scheduled elimination of almost all non-tariff measures and substantial reduction of tariffs on commitments. Internally, Vietnam's commitments are to improve transparency and

[5] Under the Decision 46/2001/QD-TTg of the Prime Minister.
[6] Since 1986, Vietnam's economic reform can be divided into 3 phases: (1) from 1986 – 1999; (2) from 2000 – 2007 (before WTO membership); and (3) 2008 – present (after WTO membership)

eliminate discrimination between domestic and imported products, and between domestic and foreign investment. The country has also been implementing a transparent, non-discrimination and WTO-compatible pricing policy. With respect to foreign trade activities, a number of trade policies have been adjusted. For example, export tax rates for many products have been reduced or export subsidies for agricultural products abolished upon accession. Vietnam committed to maintaining domestic support for agriculture below 10% of production value and to complete elimination of all prohibited industrial subsidies upon accession (CIEM, 2010).

Table 2-2: The average tariff rate for Vietnamese agricultural and industrial sectors under the WTO commitment in 2007

Sector	Number of tariff lines	MFN rate (%)	WTO committed rate (%)	Reduction (%)
Agriculture	1,224	23.5	21.0	10.6
Industry	9,465	16.6	12.6	23.9
Total/average	10,689	17.4	13.4	23.0

Source: (MUTRAPII, 2008).

Regarding foreign exchange management, the liberalization has progressed from very strict control over foreign exchange to a gradually more relaxed and flexible management regime. After the Asian crisis in 1997-98, all economic entities were required to deposit all foreign exchanges in one onshore account with an 80% surrender requirement of available balances. However, this restriction was eased to 50% in 1999 and further reduced to 40% in 2001, 30% in 2002, and was removed in 2003 (Vo, 2005).

To promote exports, Vietnam has implemented various measures including zero export duty, tax exemption, export credits, and notably, a duty drawback scheme. Under this duty drawback scheme, exporters pay duty on their inputs and are reimbursed for the share of imports used to produce exported goods. Export credit is a policy tool for granting exporting firms ready access to credit without discrimination. In Vietnam the state-owned commercial banks (SOCBs) have generally only accepted land Treasury Bonds as collateral for lending (Vo, 2005). In practice, the SOEs (including joint ventures of foreign companies with SOEs) normally have privilege to access the SOCBs. The subsidized institutional credit

facilities are offered through the Development Assistance Fund, which was established in 1999 and upgraded to the Vietnam Development Bank in 2006.

In parallel with the economic reforms, the acceleration of the process of international economic integration has played a key role in enhancing efficiency and promoting economic growth (Vo, 2005). Vietnam has approached trade liberalization in both bilateral and multilateral dimensions, with the major target of gaining benefits from global market integration.

On a bilateral basis, Vietnam first made a bilateral trade agreement with the United States in 2000. Then in 2008, the country signed the Comprehensive Economic Partnership Agreement with Japan (VJEPA), regarded as the country's first bilateral free trade agreement (FTA). The negotiation process of forming an FTA with Chile has been underway since 2008.

Vietnam's FTA picture seems brighter if seen from a multilateral perspective, especially via its role as a member of ASEAN. The country's first official engagement with multilateral agreements commenced with the conclusion of a preferential trade agreement (PTA) with the European Economic Community (now the European Union) in 1992. After joining the ASEAN FTA (AFTA) in 1995, Vietnam and other ASEAN members moved ahead with a strategy of "ASEAN + 1" by signing various FTAs with their key trading partners in Asia and the Pacific region, for example: with China in 2002 (ACFTA); with Korea in 2006 (AKFTA); with Japan in 2008 (ASEAN-Japan Comprehensive Economic Partnership Agreement (AJCEP); with Australia and New Zealand in 2009 (AANZFTA); with India in 2010 (AIFTA); and the most recent FTA is with EU in 2015. A further breakthrough in the process of door-opening and economic integration into the global market was marked by Vietnam gaining full-fledged membership of the WTO in January 11, 2007 after more than eleven years of negotiation. Table 2-3 next page shows a brief chronology of Vietnam's trade agreements since beginning the renovation process and opening the economy in 1986.

Table 2-3: Vietnam's integration chronology from 1986 to 2015

Year	Event
1986	**Doi Moi (the Renovation) -- Economic reforms *begin***
1992	Trade agreement with European Union (EU)
1995	WTO accession working party established
	Joined Association of South East Asian Nations (ASEAN) (in July)
1998	Joined the Forum of Asian Pacific Economic Cooperation (APEC)
1999	MFN agreement with Japan
2000	**US –Vietnam** Bilateral Trade Agreement (**UVBTA**) signed
2001	CEPT/AFTA implementation plan under ASEAN begins
2002	**ASEAN-China** Free Trade Agreement (**ACFTA**) signed
	Implementation of US - Vietnam BTA begins
2003	**ASEAN-Japan** Comprehensive Economic Partnership (**AJCEP**) signed
2004	EU-Vietnam bilateral agreement on WTO accession
2006	CEPT/AFTA under ASEAN implementation to be completed
	ASEAN-Korea Free Trade Agreement (**AKFTA**) signed (in May)
2007	Joined World Trade Organization **(WTO)** (on 11 January)
2008	**Vietnam-Japan** Economic Partnership Agreement (**VJEPA**) signed (in December)
	ASEAN-Japan Comprehensive Economic Partnership Agreement (**AJCEP**) goes into force (from December).
2009	**ASEAN-Australia-New Zealand** FTA (**AANZFTA**) signed (in February)
	ASEAN-India FTA (**AITIG**) signed (in August)
	VJEPA goes into force (from September)
2010	ASEAN-Australia-New Zealand FTA (**AANZFTA**) into force
	ASEAN-China FTA (**ACFTA**) fully in force
2011	Taking part in negotiation process of Trans-Pacific Strategic Economic Partnership Agreement **(TPP)**.
2014	Completed negotiation process of FTA with customs union with Russia-Belarus – Kazakhstan (**VCUFTA)** in December.
2015	Completed negotiation process of FTA with European Union (**EVFTA**) in August
	Completed negotiation process of **TPP** in October

Source: Author adapts and updates base on Abbott et al. (2008).

Apart from these trade agreements, Vietnam is also a member of a pluri-lateral Partial Scope Agreement[7], named Global System of Trade Preferences among Developing Countries (GSTP) in 1988, which includes 43 countries and covers trade in goods only. The membership helps to explain the wide connections of Vietnam's Regional Trade Agreements (RTAs) (illustrated by the map in Appendix 1), although the country's trade agreements have mainly focused on the Asia-Pacific and Oceania Region.[8]

2.3 AGRICULTURE IN VIETNAM'S ECONOMY

2.3.1 Economic contributions

Agriculture's contribution to the economy takes various forms. Johnston and Mellor (1961) list five such roles for agriculture: increasing the supply of food for domestic consumption, releasing labour for industrial employment, enlarging the size of the market for industrial output, increasing the supply of domestic savings, and earning foreign exchange by exporting agricultural commodities.

The agricultural sector plays a crucial role in Vietnam's economic development. Since embarking on economic reform, Vietnam's agriculture has made considerable progress. The sector was progressively transformed from self-sufficiency to commercial production following the pressure of a market oriented economy (Nguyen, 1998). Agricultural output has been diversely developed, with regard not only to production for domestic consumption but also for export. During the period from 2000-2010, the agricultural sector achieved a high annual average growth rate of 4.3%.[9] Agriculture production and value added continuously increased over time, although its importance diminished in terms of its percentage of GDP (Table 2-4).

Although Vietnam has recently joined the group of middle-income nations,[10] it remains a rural-based and agricultural country, with 67.69 % of its population living in rural areas. The agricultural sector employs 47.4% of the total working population (from age of 15) of the country (Table 2-4). The proportion of total households

[7] Based on WTO's classification at:
http://rtais.wto.org/UI/PublicShowMemberRTAIDCard.aspx?rtaid=146
[8] See Appendix 1 for the list of Vietnam RTAs in force notified to WTO
[9] GSO data.
[10] GDP per capita reached US$1,100 in 2009 (World Bank, 2010)

involved in agricultural activities was 60% in 2010. Over time, there has been a slow decrease in agricultural labour, but the rural population continues to increase. This induces a high rate of underemployment and creates a challenge for rural development in Vietnam.

Table 2-4: The share of agriculture in the national economy

		1990	1995	2000	2005	2010	2013
1	**Population** *(millions people)*	66.02	72.00	77.63	83.31	86.93	89.71
	Rural population *(% population)*	79.75	77.81	75.63	72.72	69.61	67.69
	Urban population *(% population)*	20.25	22.19	24.37	27.28	30.39	32.31
2	**Total employment** *(% population, 15+)*	77.90	74.73	70.70	75.50	75.20	75.50
	Employment in agriculture *(% total employment)*	73.00*	70.00	65.30	51.70	48.70*	47.40
3	**Land area** *('000 sq. km)*	325.49	325.49	311.06	310.07	310.07	310.07
	Agricultural land *(% land area)*	20.66	21.75	28.23	32.43	34.73	34.97
	Arable land *(% land area)*	16.40	16.60	19.93	20.51	20.76	20.64
4	**GDP** *(current billions US$)*	6.47	20.74	33.64	57.63	115.93	171.39
	Agriculture, value added *(current billions US$)*	3.89	6.84	7.65	12.43	21.90	-
	Agriculture, value added *(% of GDP)*	38.74	27.18	22.73	19.30	18.89	18.38
5	**Agricultural raw materials exports** *(% merchandise exports)*	-	-	1.92	3.75	3.42	2.38
	Food exports *(% merchandise exports)*	-	-	25.31	20.23	19.26	14.45

Source: World Bank's Databank; (*) data from Vietnam's GSO.

Regarding contribution to exports, Vietnam's agriculture sector is highly export-oriented, with approximately 30% of the total agricultural output value produced for export (Nguyen and Tran, 2008). For example, the export of rice made up 20% of the total rice production. This compares with coffee - 95%, rubber - 85%, cashew nuts - 90%, tea - over 80%, and pepper - 95%. The proportion of agricultural exports to total exports has been kept around 20 - 21% of total export revenue. In the world market, Vietnam now ranks second in terms of rice export value (behind Thailand, but ranks first in terms of exported volume), second in coffee (behind Brazil), third in the exports of cashew nuts, first in pepper, and the fourth largest

exporter of natural rubber (behind Thailand, Indonesia, and Malaysia). As agriculture remains the major source of employment in Vietnam, a capacity to compete in the world market is crucial for the country to secure the living standards for the largest part of the population. In terms of poverty reduction and alleviation, Vietnam's success has therefore occurred in conjunction with a surge in agricultural exports during the last two decades.

In Table 2-5, agricultural product export value increased almost four fold between 2000 and 2010 (from US$ 4 billion to US$ 15.3 billion). According to MARD's report, in 2012 agricultural exports had created the first ever surplus of US$ 10.6 billion (total export value reached US$ 27.5 billion, whereas the total import value of the sector was only US$ 16.9 billion), while other economic sectors such as industry and service continue to suffer a trade deficit.

Table 2-5: Export value of main agricultural products, 2000 – 2011 (mil.USD)

		2000	2005	2008	2009	2010	2011
I	***Total Exports***	***14,483***	***32,447***	***62,906.0***	***57,096.0***	***72,236.7***	***96,256.8***
A	Agricultural exports	4,041.8	7,199.9	12,858.0	12,261.0	15,285.8	19,713.4
	Percentage (in total Exports)	*27.9%*	*22.1%*	*20.44%*	*21.47%*	*21.16%*	*20.48%*
1	Rice	668.0	1,000.0	2,902.0	2,664.0	3,247.9	3,643.1
2	Rubber	170.0	578.0	1,597.0	1,227.0	2,388.2	3,223.1
3	Coffee	485.0	600.0	2,021.0	1,731.0	1,851.4	2,741.4
4	Cashew nuts	168.0	470.0	920.0	847.0	1,134.7	1,475.7
5	Pepper	147.0	150.0	313.0	348.0	421.4	745.6
6	Fruits & Vegetables	205.0	208.0	396.0	439.0	460.3	627.9
7	Tea	69.0	107.0	147.0	180.0	200.0	201.4

Source: GSO's and MOIT's database.

2.3.2 Constraints of agricultural development

Although contributing significantly to the nation's economic growth and exports, Vietnam's agricultural sector is also facing critical development constraints. The first is limited agricultural production resources, where the lack of adequate arable land is the most important factor. Being a densely populated country, the country's arable land per capita is quite low, even by Asian standards (Figure 2-2). In

2009, while agricultural land accounted for 33.1% of country's total area, the proportion of arable land area was only 20.25%. Thus, the arable land area per person in Vietnam is only 0.073 hectares (lower than Asia's average of 0.116 hectares). One reason for this is that agricultural land has been increasingly converted into industrial parks, which impacts on the well-being of farmers (Nguyen et al., 2006).

Along with the limited availability of arable land is the increasing rate of landless farmers in Vietnam's rural area. According to the FAO (2002), many rural people in developing countries suffer from hunger because they are landless, or do not hold secure land tenure, and Vietnam is no exception. Nguyen et al. (2006) and Akram-Lodhi (2005) found a close link between landlessness and poverty for agricultural households in Vietnam. Agricultural households can fall into chronic poverty if they lose their productive land or sell their land to survive. The landless and near-landless population in Vietnam is significant and increasing, and will have a major impact on the socio-economic development of most regions, especially the Mekong River Delta and Highland regions. In another study, Dao et al. (2005) identified several causes of landlessness in Vietnam. One of the most significant is field accumulation. The share of landless farm households in 2006 was 4.05% of the total number of farm households (Do and Nguyen, 2010).

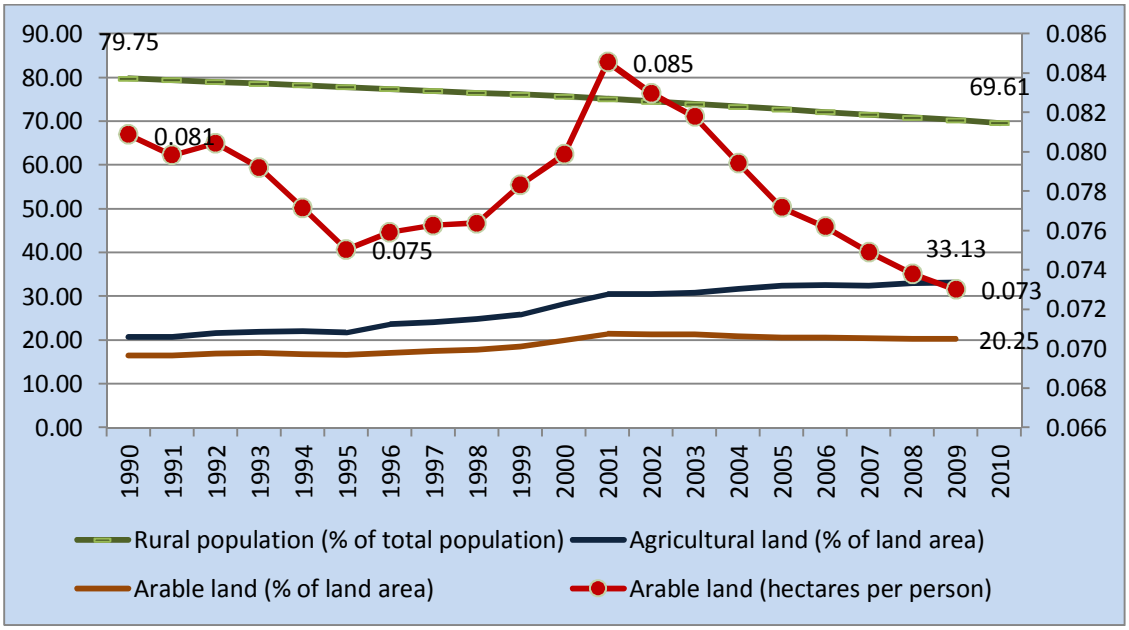

Figure 2-2: Vietnam's rural population and arable land area, 1990 – 2010

Source: World Bank's database.

Another constraint of Vietnam's agricultural sector is import-dependence on production inputs and materials. Currently, Vietnam is one of the world's leading agricultural products exporters, yet seeds that have high quality, high productivity, and tolerance to drought, diseases, and pests are all imported. With the expense of seeds reaching nearly 60 – 70% of total production costs, local farmers earn low profits, as they rely heavily on imported seeds (Ngoc, 2012). Similarly, Figure 2-3 shows that on average about two thirds of chemical fertilizers have come from imports for the past fifteen years. Moreover, the country's domestic consumption has been highly dependent on imported sources of animal feed and ingredients, wheat, cotton, wood, hides and skins, and dairy products. Much of these imports go into processing for re-export.

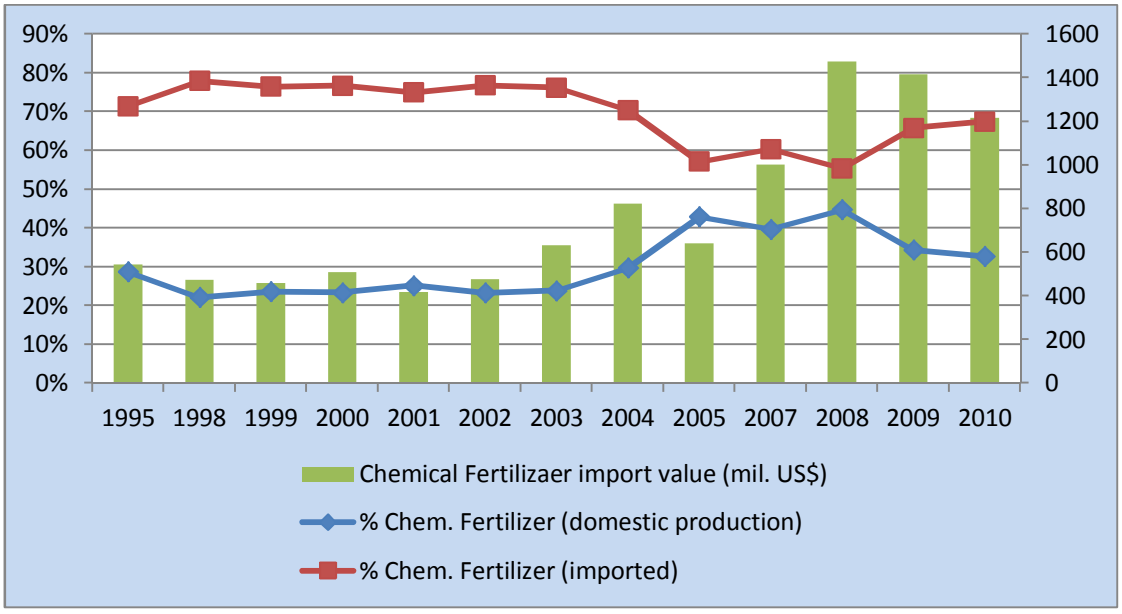

Figure 2-3: Percentage of chemical fertilizer imported since 1995

Source: GSO's Statistics Yearbooks 2001, 2005, 2010 and MOIT's reports.

Each of the above-mentioned constraints explain why Vietnam's agro-product exports still have quite low value added, even though the country has a comparative advantage in endowments. Most of the agro-product exports are in the form of raw commodities or low value added. In 2010, raw materials and unprocessed or simply processed agro-products accounted for 86% of total agro-product export value.[11] In terms of value added contribution to GDP, the agricultural sector actually

[11] Enterprises' from online magazine, 18th June, 2011 at url: http://dddn.com.vn/20110616033836501cat122/doi-moi-mo-hinh-xuat-khau.htm

experienced a sharp reduction over the period from 1986 to 2011 (Figure 2-3). This trend is further illustrated by the decreasing share of the sector in GDP and of agricultural products in total exports (Figure 2-4 and Figure 2-5). Although this fact reflects the industrialization process in Vietnam, it also demonstrates the impact of constraints facing the agricultural sector. Vietnam's agriculture has also been coping with other challenges including poverty and inequality in rural areas, underemployment, and uncontrolled immigration to cities that causes a shortage of agricultural labour during high harvesting seasons.

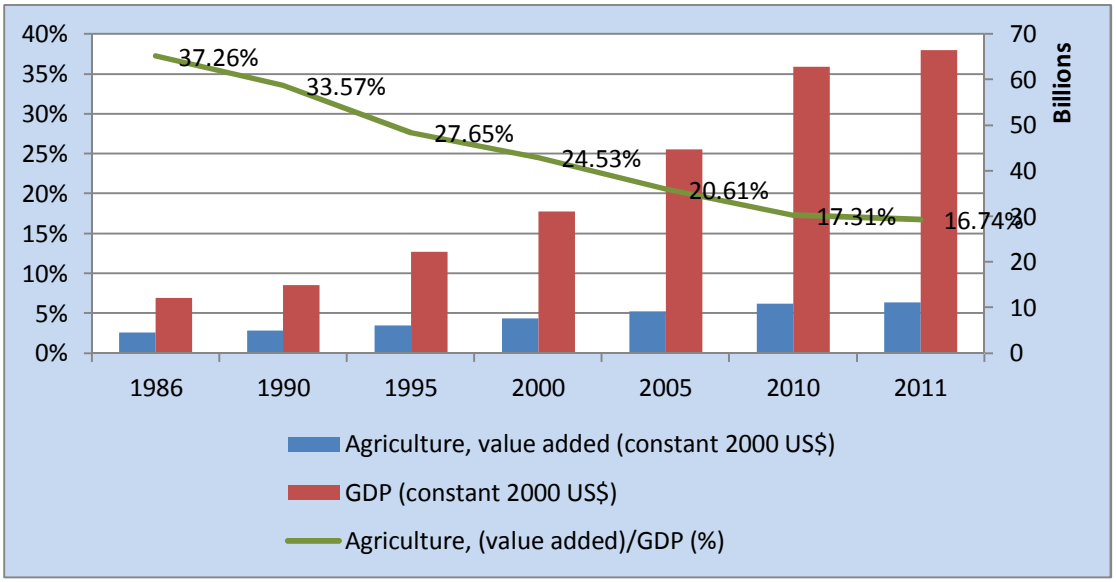

Figure 2-4: Agriculture value added in total GDP, 1986-2011

Source: World Bank's database.

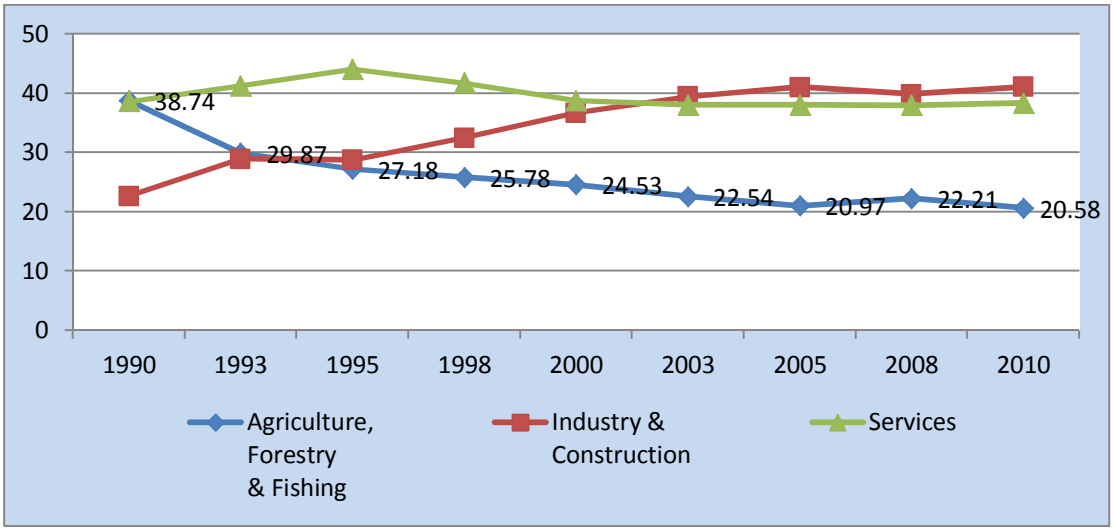

Figure 2-5: Structure of Vietnam's GDP by economic sector, 1990 – 2010 (%)

Source: GSO's Statistical Yearbooks 2005 and 2010.

Opening up the economy and integrating into the international market via trade agreements has also brought significant challenges to Vietnam's agricultural sector. There has been much concern and debate in Vietnam over the WTO accession commitments, which lower the level of protection for agricultural products. Doan and Vo (2009) attribute the concern to two reasons so that Vietnam's agriculture has been seen highly vulnerable to international competition. First, most of Vietnamese poor earns their livelihood from agricultural activities. Second, agriculture sector in Vietnam has not been strictly protected, by international standards, as in many developed countries. Moreover, Vietnam's commitments also require that it apply the complex Agreement on the Application of Sanitary and Phytosanitary Measures (SPS) right from the date of accession, with no transition period. The stringent food safety requirements can diminish competitiveness and impede agro-product exports from Vietnam (Doan and Vo, 2009, Jaffee and Henson, 2005).

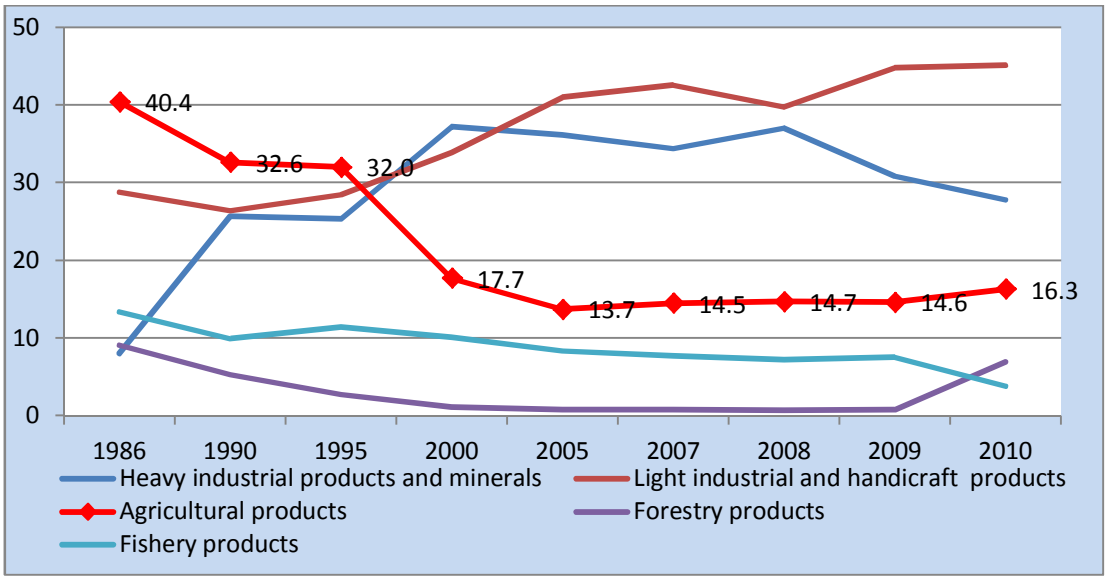

Figure 2-6: Vietnam's merchandise exports by commodity group (unit: %)

Source: GSO's Statistics Yearbooks 2005 and 2010; (GSO, 2006)

Another issue also widely studied in the literature is agricultural commodity price volatility. Benjamin and Brandt (2004) argue that changes in agricultural prices could be a primary way of affecting household behaviour and welfare. However, a literature search indicates that empirical evidence regarding agricultural commodity price volatility in Vietnam is rare. Among a handful of studies which discuss this issue, are those of Niimi (2007), Fulton and Reynolds (2012), Vu and Glewwe (2011).

The case of rice can be used to examine the trend of price fluctuation, as it is one of Vietnam's most important agricultural sub-sectors. In Vietnam, rice price can influence to prices of many other foodstuffs due to it is the stable food and contributes about two-thirds of daily calorie intake of mostly all households. Furthermore, about 60% of cropland in the country is for rice and the crop provides an important source of agricultural income (Coxhead et al., 2012). Data from the VHLSS 2006 also shows that four-fifths of poor households were identified as rice growers (Vu and Glewwe, 2011).

Figure 2-7 shows the gap between the export price and paddy price (understood here as farm-gate price) in Vietnam's rice sector from June 2007 to June 2012. The two trend lines of price variation proved to be only a small diversion in which export price tended to increase faster than paddy price. During the food price crisis in 2007-2008, it seems that only rice exporters earned extra margins created by high rising prices. Given half of the households produced rice, this makes it hard to generalize on the relative benefits of increases in the prices of rice. Net surplus producers clearly benefit, but those that largely consume rice do not.

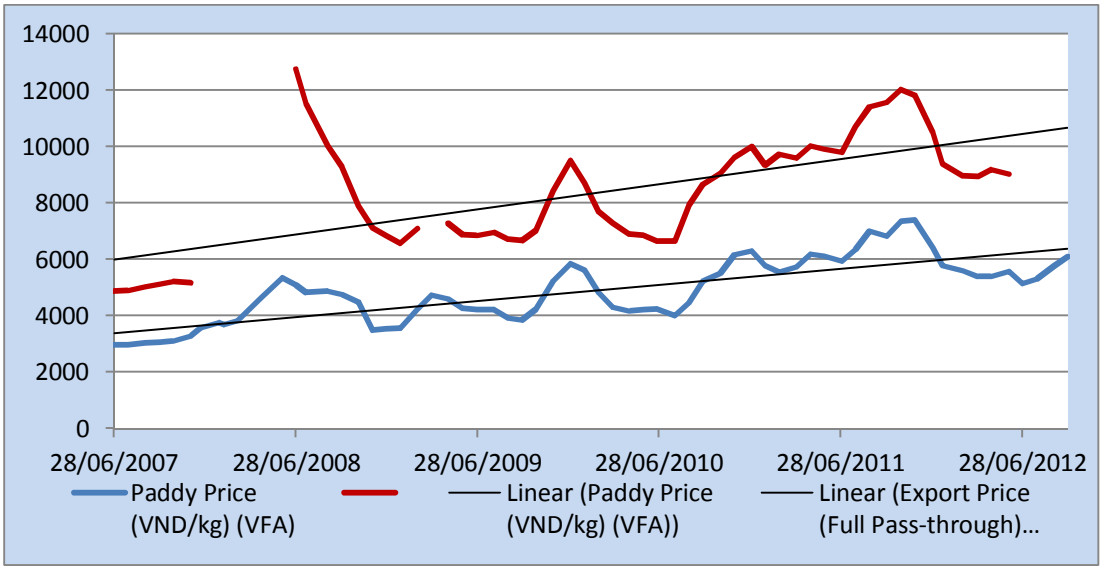

Figure 2-7: Rice price trend from 2007 – 2012

Source: Author's calculation based on GSO's, VFA's, IFS's data.

After becoming a WTO member in the beginning of 2007, the contribution of agriculture in Vietnam's GDP growth rate was affected by various factors and world price volatility. As shown in Table 2-6, the growth rate of the agricultural sector in GDP reached a record-low level of 1.32% in 2009, the lowest since 1991. Research

from CIEM (2010) argues that this decrease mostly stemmed from world prices of most agro-products, which dropped dramatically in 2009. Vietnam's key exports of agricultural products such as rice, coffee, pepper, and rubber were not exceptions. On the other hand, prices of agricultural inputs such as fuel, fertilizers, herbicide, and pesticide went up rapidly. Moreover, the fact that Vietnam's agriculture is still heavily dependent on weather conditions and imported agricultural inputs made the situation worse.

Table 2-6: GDP growth rate by sector, 2004 – 2009 (%)

Sector	*Before WTO*			*After WTO*		
	2004	**2005**	**2006**	**2007**	**2008**	**2009**
GDP (whole economy)	**7.79**	**8.44**	**8.23**	**8.46**	**6.18**	**5.32**
Agriculture, forestry and fishery	***4.36***	***4.02***	***3.69***	***3.76***	***4.07***	***1.83***
Agriculture	3.92	3.16	3.13	2.72	3.93	1.32
Forestry	0.82	0.94	1.37	1.39	1.35	3.47
Fishery	8.53	10.66	7.77	10.57	5.44	4.28
Industry & construction	***10.22***	***10.69***	***10.38***	***10.22***	***6.11***	***5.52***
Processing & manufacturing	10.86	12.92	13.36	12.37	9.94	2.76
Services	***7.26***	***8.48***	***8.29***	***8.85***	***7.18***	***6.63***

Source: CIEM (2010)

2.4 RICE SECTOR – VITAL ROLE AND CHARACTERISTICS

The 1981-1988 economic reforms in the agricultural sector have been widely recognized as the underlying factors behind the boost in Vietnam's rice production and exports in the 1990s (Young et al., 2002). In particular, since the "Doi Moi" policy launched in 1986, the government has liberalized the rice market, as well as the markets for agricultural inputs. The cumulative effect of these reforms has been a consistent increase in rice production from 1989 to the present, enabling the country to satisfy domestic demand and sell surplus production internationally (Nguyen and Talbot, 2013). Rice production, particularly rice area and rice yield, have therefore increased significantly and Vietnam has shifted rapidly from a persistent rice importer after the war until 1989, to become one of the largest rice exporters in the world.

2.4.1 Rice production and export

Paddy/rice has been the predominant crop in the Vietnamese agricultural sector for several thousand years. The crop currently accounts for around 78% of annual cropland and up to 90% of staple food production, which is about one half of total agricultural production (Ryan, 2002) (see Table 2-7). In addition, rice also contributes about 70.6% of the total calorie intake of Vietnamese households and almost 33% of the value of households' food expenditure (World Bank, 2012b) and of farm households engage in rice farming as a staple crop (Vu and Glewwe, 2011).

Table 2-7: Rice land use, production and yield in Vietnam (2000-2013)

Year	Annual crops land area (000 ha)	Grains			Paddy				
		Planted Area (1000 ha)	% of Annual Crop Land	Output (1000 tons)	Planted Area (1000 ha)	% of Grain Planted Area	Output (1000 tons)	% of Grain Output	Yield (tons/ha)
	[1]	[2]	[2]/[1]	[3]	[4]	[4]/[2]	[5]	[5]/[3]	[6]
2000	10,540.3	8,399.1	79.69	34,538.9	7,666.3	91.28	32,529.5	94.18	4.24
2005	10,818.8	8,383.4	77.49	39,621.6	7,329.2	87.43	35,832.9	90.44	4.89
2010	11,214.3	8,615.9	76.83	44,632.2	7,489.4	86.93	40,005.6	89.63	5.34
2011	11,420.5	8,777.6	76.86	47,235.5	7,655.4	87.22	42,398.5	89.76	5.54
2012	11,537.9	8,918.9	77.30	48,712.6	7,761.2	87.02	43,737.8	89.79	5.64
2013	11,709.3	9,073.0	77.49	49,270.9	7,899.4	87.06	44,076.1	89.46	5.58

Source: GSO's Statistical Yearbooks 2006, 2013, p.369-373

Rice is grown in all agro-ecological regions in Vietnam[12], but the majority of rice is produced in Mekong River Delta (MRD) in the South and Red River Delta (RRD) in the North. Although accounting for only 18.4% of total agricultural lands, these two regions contribute over two-thirds of the whole country's total rice output. Data provided also indicates that total land allocated to paddy rice accounts for almost half of agricultural land use annually, half of which is planted twice (two

[12] Vietnam currently has 63 provinces and they are grouped into either 8 agro-ecological zones (as in VHLSS datasets) or 6 agro-ecological zones (as in GSO's publications). In this dissertation, depending on the data available and analyzing purpose, either categorization is used correspondingly. The 8 zones include: (1) Red River Delta (RRD), (2) North East (NE), (3) North West (NW), (4) North Central Coast (NCC), (5) South Central Coast (SCC), (6) Central Highlands (CH), (7) South East (SE) and (8) Mekong River Delta (MRD).

crops) per year[13]. In some areas of MRD region, which has more favourable conditions for growing rice (such as more fertile soil or well irrigated land), the intensity rises to three rice crops per year. However, this practice has been considered as an over-exploitation that might result in soil erosion and other environmental issues in the long-term accompanied by reduction of rice production economic efficiency. More than 94% of the rice-growing land area is allocated to individual households (UNEP, 2005).

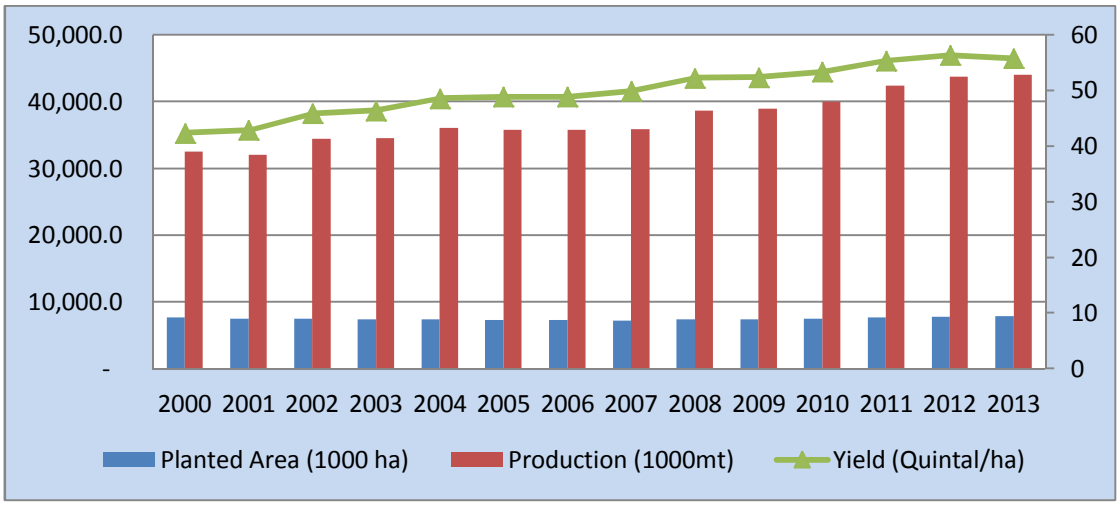

Figure 2-8: Paddy output and yield in Vietnam 2000 - 2013

Source: GSO's Statistical Yearbooks 2013, 2011

From year of 2000 to 2013, Vietnam has experienced a sustain growth in rice yield (see Figure 2-8). Currently, the average rice yield is about 5.6 tons per hectare, which is relatively high compared to the average yield of rice production in other Southeast Asian countries (Tsukada, 2011). Growth of rice yield over times is attributed as the main driving force of steady increase in Vietnam's rice output since 2000 (Tsukada, 2011). The transformation of agricultural land in general and paddy land in particular can be observed in Table 2-8, in which the South East area, the most industrialized and urbanized region of the country, shows a sharp decrease of 46.8% of paddy planted area for last thirteen years.

Although Vietnam has experienced a rapid increase in rice production, the growth rate has not been uniform across regions in the country. While the RRD and South East regions have undergone a decline in paddy planted area (but an increase

[13] In Vietnam, the average rice cropping intensity is 1.6 harvests per year (UNEP, 2005, p.22)

in yield), the MRD and Central Highlands have shown a significant increase in paddy planted area, output, and productivity over the period between 2000-2013 (Table 2-8). It can be observed that every region depends on the productivity growth to realize the increase in rice output. The expansion of the planted area has played a marginal role in most regions other than the MRD and Central Highlands. Table 2-8 also reveals the opposite trends of Vietnam's two main rice granaries, RRD and MRD, in terms of planted area and rice output. The upward trend prevailing in the MRD has given the region a dominant position in the Vietnamese rice sector, while the RRD's proportion has tracked gradually downward over the years from 1995 to 2013.

Table 2-8: Growth in paddy planted area, production and yield (2000-2013)

Regions	Planted area	Production	Yield
Red River Delta (RRD)	-6.8%	-1.0%	9.0%
Northern Midlands & Mountainous Areas	0.2%	42.9%	36.8%
Northern Central and Central Coastal Area	10.1%	32.7%	33.6%
Central Highland (CH)	30.9%	98.2%	51.2%
South East (SE)	-46.8%	11.0%	50.5%
Mekong River Delta (MRD)	9.9%	49.6%	36.2%
Whole country	3.0%	35.5%	31.6%

Source: Author's calculation from GSO's Statistical Yearbooks

Figure 2-9 shows that in 2013, the MRD region contributed over 56% of the total paddy production of the country, followed by the RRD region with 15%. These two deltas contribute over 72% of the country's total paddy output. In terms of rice yield, the RRD outperforms the MRD, with an average yield of 5.9 tons/hectare compared with average of 5.6 tons/hectare from MRD.[14] This might be explained by the small-scale and labour-intensive cultivation in the northern part of Vietnam (Tsukada, 2011).

[14] See Appendix 2 for details of regional proportion in total paddy planted area, output and yield from 1995-2013.

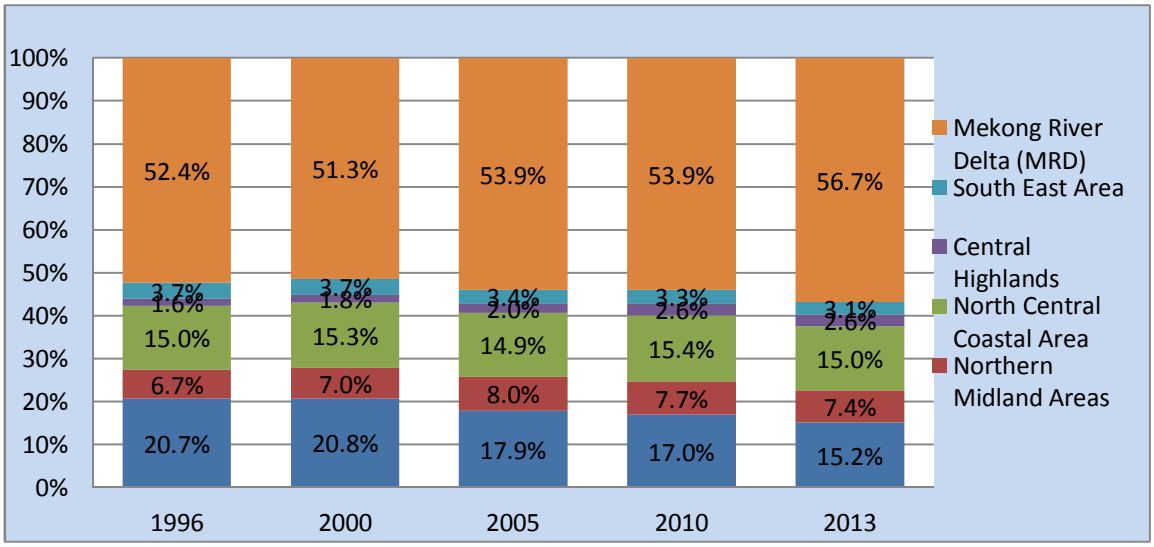

Figure 2-9: Proportion of paddy production by region (1996-2013)

Source: GSO's Statistical Yearbooks 2000, 2006, 2013.

With regard to regional rice balance, Table 2-9 reveals that all regions in Vietnam had rice surplus in 2009 and 2011, with the exception of the Central Highlands (CH) and South East (SE) regions. The MRD had a significantly high sufficiency index[15] of 3.33 (2009) and 3.52 (2011), while other regions, including RRD, had only marginal rice surplus. The majority of rice exports were rice produced in the MRD, while the remainder of the production surplus was transported to other deficit regions of Vietnam.

Table 2-9: Vietnam's regional rice balance, 2009 & 2011

	Paddy production (mil. Tons)		Rice available (mil. Tons)		Rice requirement (mil. Tons)		Rice Balance (mil. Tons)		Index of Sufficiency	
	2009	2011	2009	2011	2009	2011	2009	2011	2009	2011
Countrywide	39.1	42.3	21.1	22.8	13.5	13.8	7.59	9.01	1.59	1.65
MRD	20.5	22.2	11.1	12.0	3.33	3.4	7.74	7.74	3.33	3.52
RRD	6.64	7.19	3.75	3.88	2.99	3.05	0.76	0.76	1.25	1.27
NC/SC	6.25	6.76	3.38	3.65	2.86	2.92	0.52	0.52	1.18	1.25
NE/NW	3.05	3.3	1.65	1.78	1.64	1.68	0.01	0.01	1.01	1.06
C. Highland	0.99	1.07	0.54	0.58	0.74	0.77	-0.2	-0.2	0.72	0.75
SE	1.33	1.44	0.72	0.78	1.97	2.01	-1.25	-1.25	0.37	0.39

Source: 2009 data from ISG-MARD (2011), 2011 data from JICA (2012)

[15] This index is the ratio between rice available and rice requirement

In terms of exports, Vietnam has been a significant net exporter of rice since 1989. Vietnam's rice export volume increased from 3.48 million tons in 2001 to the peak of 8 million tons in 2012. On average, rice export volume annually accounts for about 22% of total rice output of the country for the last ten years. Most of Vietnam's rice exports are from MKD region which account for about 53% on average of total the whole country's rice output for the period of 1995-2014 (Figure 2-10). According to some recent research, MKD's production accounts for 95% or more of Vietnam's annual total rice exports (ISG-MARD, 2011, Kompas et al., 2014), indicating the important role of the region in contributing to the country's foreign exchange earnings. Furthermore, the MRD's rice sector is now almost entirely commercialized, with only about 7% of the region's paddy production being held by farmers for their own consumption, in addition to their use of paddies for seed and feed (ISG-MARD, 2011).

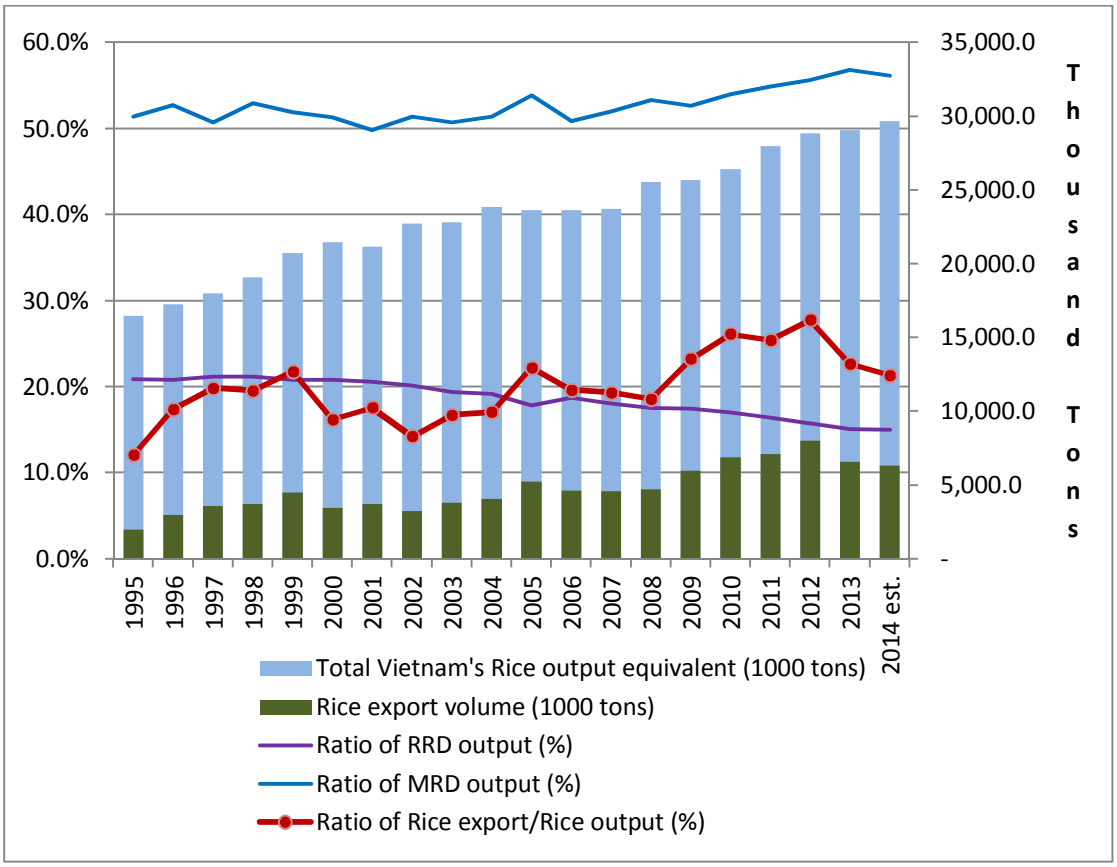

Figure 2-10: Proportion of rice export in total rice output 1995-2014

Source: GSO's online database, accessed Oct, 2015

Table 2-10 illustrates the commercialization trend showing that the rice export value has increased over the years and contributes to around 25% to 30% of the total

country's agricultural export earnings for the period of 2000–2012. However, although Vietnam contributes about one-fifth of the annual world rice exports by volume, it accounts for only around 5% in terms of value, indicating a combination of lower quality and lower value added rice exports (Nguyen and Talbot, 2013). As one of the world's main rice exporters (others include Thailand, India, Vietnam, and Pakistan) which is active in the international rice market, Vietnam is capable of offering all three categories of low-, medium-, and high-priced rice. However, given only a 5% share in terms of value, the domination of low-price rice in total country's rice exports is obvious.

Table 2-10: Rice exports in total export value 2000 - 2012

	Total export Value (mill. US$)	**Agricultural exports** (mil. US$)	**Rice export value** (mill. US$)	**Ratio of rice export/agri. Exports** (%)	**Ratio of rice export/rice production** (%)
2000	14,482.7	2,563.4	667.8	26.1	16.2
2003	20,149.3	2,672	719.9	26.9	16.7
2005	32,447.1	4,467.4	1,408.4	31.5	22.2
2007	48,561.4	7,032.8	1,490.2	21.2	19.3
2009	57,096.3	8,352.8	2,663.9	31.9	23.2
2011	96,905.7	14,447.5	3,659.0	25.3	25.4
2012	114,529.2	15463.4	3,672.8	23.8	-

Source: Rice export data from MOIT, agricultural exports from GSO's statistics. The last column's values were calculated from GSO's and MOIT's data.

2.4.2 Characteristics and regional differences of rice production

2.4.2.1 High cropping intensity in the MRD and RRD

The average paddy/rice cropping intensity in Vietnam is approximately 1.6 crops per year and about 55% of the total rice paddy area is double cropped (UNEP, 2005). Double cropping of paddy/rice is widespread in the RRD, the river basins along the Central Coast, and the MRD. This double cropping may involve one rainy season harvest and one winter-spring harvest. In the Red river region, the winter-spring crop is planted in February and harvested in May-June, while in the Mekong this season occurs three months earlier. Alternatively, in the MRD and other irrigated regions in the south, a double rice rotation may involve a rainy season crop and a

summer-autumn rice crop (planted in April-May and harvested in August-September). Single-cropped rice includes both upland rice and lowland rain-fed rice. Upland rice is unirrigated and planted on slopes where it is not possible to flood the fields. It is mainly grown in the Central Highlands and the Northern Uplands (UNEP, 2005).

Due to the successful development of shorter season growing varieties and improved flood and water management measures, an intensification of rice production has increased in the MRD over last the three decades as shown in Table 2-11. There has been a clear shift from single to double cropping, and, more recently, to the development of triple cropping in suitable agro-ecological areas. Over time, the single cropped areas (typically in the coastal zones) have become less important. In addition, while the triple cropped areas accounted for only 2.4% of the region's plantings in 1990, two decades later they accounted for 27.4%, while single crops decreased to only 17.7% of total rice land area in the region.

Table 2-11: Changing structure of rice cultivation in the MRD

	1980	1990	2000	2010
Single crop	70.3%	42.4%	20.9%	17.7%
Double crop	28.7%	55.2%	67.6%	54.8%
Triple crop	1.0%	2.4%	11.5%	27.4%
Total rice land	2,238,300	2,091,560	2,066,761	1,928,886
Total sown area	2,926,800	3,346,080	3,939,443	4,044,792
Cropping intensity	1.31	1.60	1.91	2.10

Source: Adapted from (ISG-MARD, 2011)

2.4.2.2 Small and fragmented rice land area per household

As previously mentioned, a prominent characteristic of rice cultivation in Vietnam is that it is carried out by large numbers of rice farmers who have small and fragmented land areas, low mechanization, and limited capital to invest (Tran et al., 2013). Table 2-12 shows the evidence of the small size of land area used by Vietnamese paddy farmers in 2011. Nation-wide, nearly 50% of rice farmers' land areas are smaller than 0.2 hectares and only 2.3% of households have more than 2

hectares of rice cultivation or the equivalent. More than 97% of rice farmers have cultivated areas below 2 hectares.

Regarding the regional difference, farm sizes tend to be smaller in the north; particularly in the densely populated RRD, where almost 65% of households have land plots under 0.2 hectares and only 0.03% of over 2 hectares of rice cultivation. In contrast, less than 9% of MRD rice growers have plots under 0.2 hectares, while roughly 13% of rice growers in the MRD have more than 2 hectares under rice cultivation. Further calculations from Table 5-2 show that in 2001, while the MRD accounted for only 15% of the total number of rice growers nation-wide, the region accounted for 55% and 87% of those national rice growers with between 0.5 and 2 hectares and more than 2 hectares, respectively (in comparison with the corresponding 5% and 0.4% of the RRD region). As a result, farmers practice increased rice cropping and achieve the highest yield in the RRD. Furthermore, there are many different varieties of rice planted in certain regions, though the rice type and quality varies greatly among households and villages (UNEP, 2005). As a consequence Vietnam dominates the "bulk white" lower quality segment of the international rice market, with about two-thirds of rice exports sold as low or medium quality grades (ISG-MARD, 2011).

Table 2-12: Proportion of household by rice land size used in 2011

Region	Number of household	Proportion of household by size of rice land used (%)				Planted rice area	Rice yield	Rice production	
		Under 0.2 ha	*From 0.2 to under 0.5 ha*	*From 0.5 to under 2 ha*	*From 2 ha and over*	*(1000 ha)*	*(tons /ha)*	*Volume (1000 tons)*	*% of Total Output*
VN	**9,271,194**	**50.04**	**34.79**	**12.9**	**2.27**	**7,655.4**	**5.54**	**42,398.5**	**100%**
RRD	2,896,436	64.84	33.19	1.94	0.03	1,144.5	6.09	6,965.9	16.4%
NMMA	1,913,797	58.12	33.48	7.94	0.46	670.9	4.77	3,199.1	7.5%
NCCA	2,561,883	53.43	39	7.36	0.21	1,228.8	5.32	6,535.1	15.4%
CH	385,935	37.83	40.68	20.39	1.1	224.2	4.76	1,067.7	2.5%
SE	147,817	12.37	40.06	42.01	5.56	293.1	4.64	1,361.2	3.2%
MRD	1,365,326	8.49	29.87	48.2	13.44	4,093.9	5.68	23,269.5	54.9%

Source: GSO's Rural, Agricultural and Fishery Census 2011, p.329-331 and GSO's Statistical Yearbook 2012, p.379-384.

Small, fragmented land areas, coupled with strict control of land-use flexibility (discussed in details in section 2.4.3 in this chapter), are the main constraints strongly effecting the household's income from rice production; hence, the impact on household's total welfare in general. High cultivation intensity and the measures applied to increase rice yield (such as investing more labour, mechanizing, or fertilizers) might help, but must be accompanied with higher costs.

In Vietnam, most farmers primarily grow rice to meet their household's food demands (Isik-Dikmelik, 2007). They only sell some of their rice output when there is a surplus, or for other essential demands such as health services and education. There are very few areas specializing in growing rice for export, as can be seen in Table 2-13 and Figure 2-11. Rice farm land size, production, and products traded differ between regions. In the North Eastern, North Western, and Central Highlands regions, rice production per household is low, as is the amount of rice. The MRD and South East regions are different from other regions with larger farms, larger rice traded proportion, and very high commercial-oriented rice production at the household level showing a potential exposure to rice price fluctuation in the international market.

Table 2-13: Rice land size, production value, and traded ratio of rice farm households in VHLSS 2010

Regions	Rice planted area	Rice Prod.	Rice Prod. value	Profit from Rice Rrod.	Profit ratio	Rice sold or bartered
	(ha/hh)	(ton/hh)	(1000 VND/hh)	(1000 VND/hh)	(% Rice Prod. Value)	(% Rice Prod.)
1. RRD	0.38	1.99	10,392.05	6,159.20	58.5%	22.1%
2. North East	0.33	1.47	8,812.67	5,748.92	63.3%	7.6%
3. North West	0.51	1.52	9,788.02	6,773.43	68.4%	8.6%
4. North Central Coast	0.43	1.89	9,825.50	5,220.84	53.2%	15.9%
5. South Central Coast	0.41	2.07	9,551.63	4,899.67	51.6%	22.5%
6. Central Highlands	0.51	2.10	9,023.29	5,274.44	60.4%	14.1%
7. South East	1.08	5.08	22,295.19	10,480.45	47.0%	67.7%
8. MRD	2.23	12.21	52,725.89	24,811.17	47.6%	78.3%
Vietnam *(average)*	**0.73**	**3.54**	**16,551.78**	**8,671.02**	**56.3%**	**29.6%**

Source: Author's calculation from VHLSS 2010.

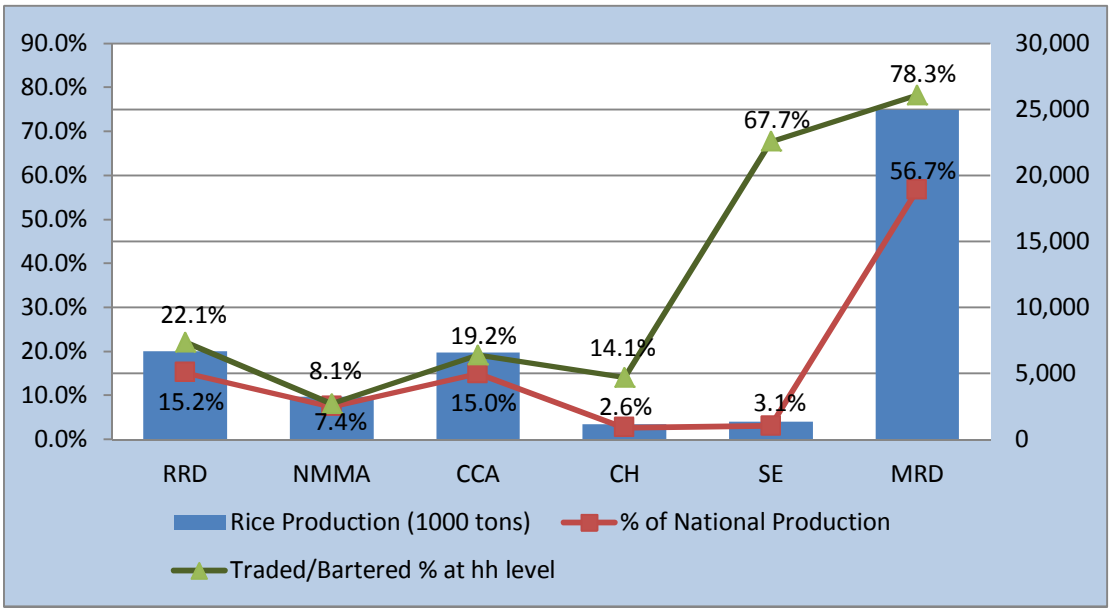

Figure 2-11: Rice production and sale ratio at the household level by region in 2010

Source: Illustration of data from Table 2-13

2.4.2.3 Inputs of rice production at household level

The production costs for Vietnamese rice are relatively low compared to other countries, especially in the two main rice granaries, the RRD and MRD (UNEP, 2005). Statistical data shows that the cost of production represents from 34% to 42% of gross revenue depending on the seasons and regions. The remainder (58% to 66%) is in the form of family labour and family owned land. Among the purchased inputs, fertilizer is the most important, accounting for 29% to 33% of total costs, followed by seeds, machinery, and agricultural land taxes. The share of expenses allocated to labour and machinery is almost twice as high in the MRD as in the RRD, reflecting the differences in cultivation methods (UNEP, 2005). Table 2-14 presents the calculation of purchased input shares of rice production costs in the RRD and MRD regions over four iterations of VHLSS data from 2004 to 2010. All rice production costs are categorized into nine main groups or items. As shown in the table, and in accordance with previous findings, cash costs for fertilizers ranks as the highest proportion, accounting for, on average, 32% to 38% of total rice production cost for whole country level.

Table 2-14: Share of purchased inputs in total cost of rice production (%)

	Cost item	2004			2006			2008			2010		
		VN	RRD	MRD	VN	RRD	MRD	VN	RRD	MRD	VN	RRD	MRD
1	Seed	13.4	8.3	10.2	12.0	7.5	8.8	11.8	7.0	8.7	12.5	7.5	8.8
2	Small tools	3.1	1.7	1.7	2.9	1.6	1.5	2.5	1.8	1.2	2.8	1.9	1.4
3	Energy, fuel	2.3	1.4	3.5	2.6	1.4	3.9	2.8	1.8	3.2	3.4	1.8	3.4
4	Hired labour	11.2	10.1	13.9	11.2	10.9	14.7	11.6	11.8	13.3	13.2	13.5	13.5
5	Fertilizers	32.5	35.9	31.9	35.2	37.5	34.2	38.3	37.2	38.0	33.0	33.3	32.6
6	Pesticide, herbicide	8.1	8.2	13.9	7.6	7.9	13.1	7.4	9.7	12.3	7.9	10.4	14.6
7	Rental assets, machines	15.3	19.7	16.5	15.3	20.5	16.4	15.1	21.3	15.1	17.6	24.7	17.7
8	Loan interest,	6.8	9.3	4.9	6.5	8.1	4.6	4.5	5.0	5.4	3.8	2.7	5.2
9	Other costs	7.2	5.3	3.7	6.7	4.7	2.9	6.1	4.4	2.7	5.9	4.1	2.9

Source: Author's calculation from VHLSS 2004 to 2010.

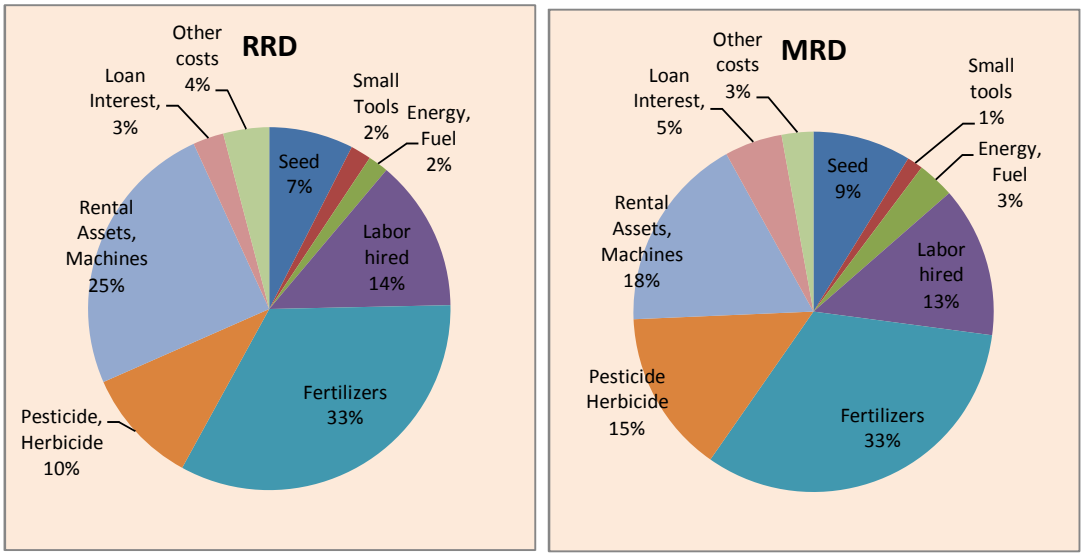

Figure 2-12: Share of purchased input cost in rice production in the RRD & MRD, 2010

Source: Illustration of data from Table 2-14.

Fertilizers

Fertilizer represents the largest component of farm input cash expenses and this is especially true for rice production. Typically, the addition of fertilizer nutrients accounts for 15% to 30% of total production costs depending upon government subsidies and labour costs (Moya et al., 2004). Figure 2-13 shows a similar proportion of fertilizer cost in total rice production cost in different regions of Vietnam. The average ratio over the years 2004-2010 ranged from 33 to 44%, in which 2008 presented the highest percentage. The economic return to fertilizer use depends on two factors: the ratio between fertilizer (input) and rice (output) price, and the yield increase per amount of fertilizer (or nutrient element) used. However, both factors in turn depend on several other parameters, including national trade policies. Since the early 1990s, in global terms fertilizer materials have become more expensive relative to rice prices. Therefore, there has been a reduced profit being derived from fertilizer use. However, this trend is not necessarily valid at the farm gate, as national policies and markets can modify fertilizers, as well as rice prices. In Vietnam, fertilizer was also found to have become more expensive relative to rice prices in recent years (Gregory et al., 2010). If the rice prices did not increase by a higher proportion, it would be expected that a rice household's welfare could be negatively affected.

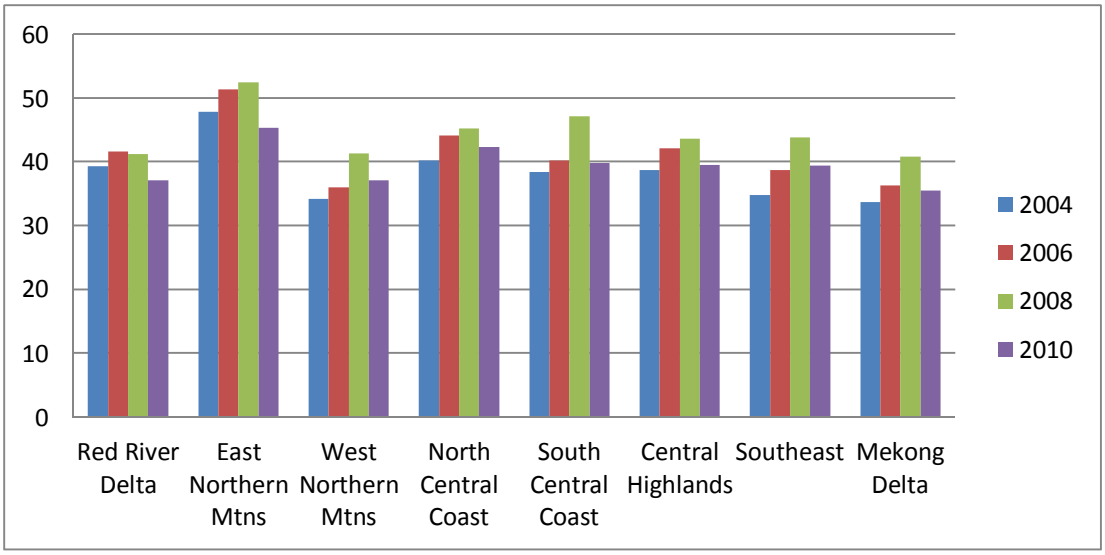

Figure 2-13: Average proportion of fertilizer cost in total cost (%)

Source: Author's calculation from VHLSS 2004 to 2010.

It is estimated that chemical fertilizers contribute around 0.6% per year to yield growth (Gregory et al., 2010). However, fertilizer productivity in rice production shows a steadily declining trend. Thus, it cannot be expected that there will be further significant productivity growth by increasing the amount of fertilizer use for irrigated rice production (Young et al., 2002). Declines in fertilizer prices should occur concurrently with the increase in supply. Even if farmers had no response to fertilizer price changes, lower fertilizer costs would directly increase farm income. To the extent that lower prices also encourage greater use of fertilizer and enable higher yields, lower prices are also expected to lead to higher crop output and revenue (Benjamin and Brandt, 2004).

The use of inorganic fertilizer in Vietnam's agriculture has increased markedly since 1980 (Nielsen, 2002) and ranges between 170-182kg/ha (Minot and Goletti, 2000). The land reform policy that gives farmers more rights in utilizing their farmland has caused the use of fertilizer in agricultural production to increase over years. This is also due in part to falling fertilizer/paddy price ratios and the increase in cropping intensity (Minot and Goletti, 2000). Due to the government removing the quota system that had applied to fertilizer imports since 2001 and its operation of a price stabilization fund to monitor and stabilize fertilizer prices, the volatility in domestic fertilizer prices has been lower than world prices. However, this low volatility has been achieved at the expense of domestic prices, being around 30% higher than world prices (Nielsen, 2002).

Regarding supply sources of various chemical fertilizers, Vietnam's domestic production sufficiently supplies certain types of chemical fertilizers such as urea (approximately 95% of total national demand), Phosphate (almost 100%), and NPK (70-80%)].[16] Some important compound fertilizers (such as SA, DAP) and other types of fertilizers for which Vietnam does not have natural ore (such as Potash), are imported. China is a dominant supplier of Vietnamese annual fertilizer imports, accounting for up to 80%. Nevertheless, official imports of fertilizer are in fact not the only sources. A significant amount is also regularly smuggled in from China. While this fact is widely known, actual estimates vary widely. Not all imports are destined for domestic consumption, as a significant border trade with Cambodia occurs (ACI, 2002).

Labour inputs

Given the dominance of double and triple cropping patterns, most of the labour usage for rice production in Vietnam is virtually year round. In some regions, mostly in the upland areas and in parts of the RRD and North Central Coast, single cropping patterns mean that labour is underemployed during some periods of the year (ACI, 2002).

The amount of labour used varies between regions, with producers in the RRD more likely to use family labour rather than hired labour and use less mechanization than in the MRD (ACI, 2002, Young et al., 2002). Farmers in the RRD use more labour in every phase of paddy production, largely because RRD farmers transplant rice seedlings rather than broadcasting seed. Similarly, harvesting in the RRD is three times as labour intensive as in the MRD, as threshing is less mechanized (Pingali et al., 1997). In the MRD, smaller growers tend to rely primarily on household labour, are less inclined to use certified seed, have had lower adoption rates of sustainable practices, and utilize little mechanization (ISG-MARD, 2011).

The use of hired labour in the MRD is a function of greater intensification of land use for cropping and the higher levels of landless labourers than in other regions. In the IFPRI survey in 1996, hired labour represented just 5% of total labour use in the RRD, but from 33% to 39% in the MRD (IFPRI, 1996). Exchange labour

[16] See figure in Appendix 5 for details.

is used extensively in the north, especially for peak activity periods (ACI, 2002). Figure 2-14 compares the cost of hired-labour between regions from 2004 to 2010 with datasets from VHLSSs. On average, the hired labour costs account for 11% to 16% in total rice production cost in RRD and MRD.

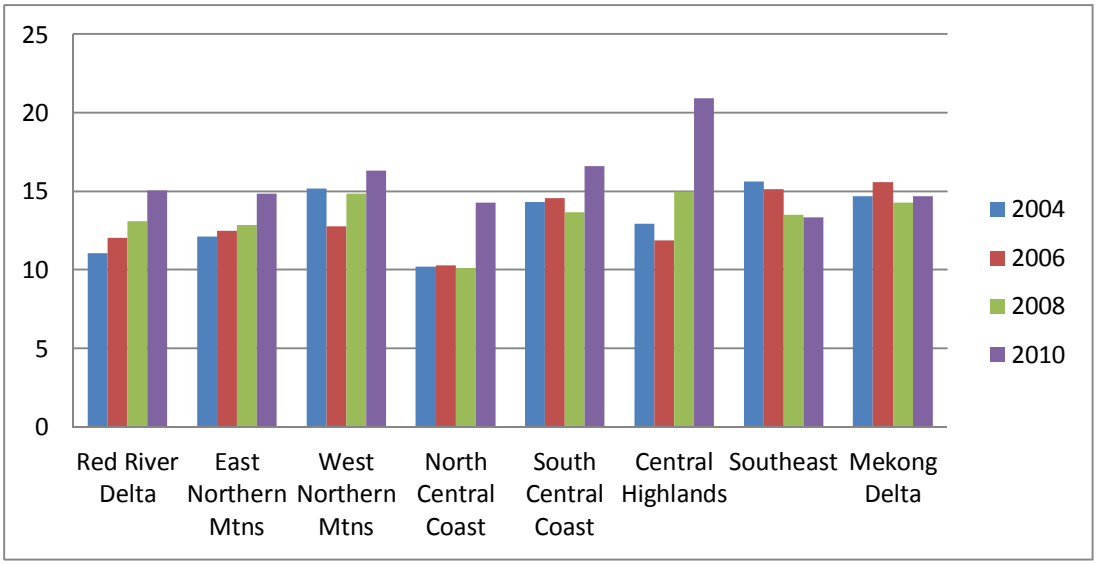

Figure 2-14: Average proportion of hired-labor cost by region 2004-2010 (%)

Source: Author's calculation from VHLSS 2004 to 2010.

Pesticide

In Vietnam's agriculture, the use of plant protection chemicals and pesticides (herbicides, fungicides, and insecticides) have increased over the years from about 20,000 tons in 2005 to about 113,000 tons in 2013.[17] As shown in Figure 2-15, around 90% of domestic demand for plant protection chemicals and pesticides are supplied from importing sources, in the form of both final products and intermediate materials for domestic productions. Similar to fertilizer, most imported pesticides are currently controlled by provincial and central SOEs. This restricts access to affordable inputs and forces farmers to source pesticides from the "black market" and smuggled inputs (Purcell, 2006).

In reality, pesticide use is considered to be much higher than mentioned in the statistics due to the illegal import of pesticides, particularly from China. The excessive use of fertilizers and pesticides is commonly practiced in Vietnam as farmers strive to get more production from their plots (ACI, 2002). Overuse of

[17] Data from GSO's Statistics Yearbooks of 2013 and 2010.

pesticides appears to be due to a poor understanding of insect management, with a reliance on zero tolerance for insect attacks on crops. Farmers will often spray too frequently, with too many chemicals, and at above recommended concentrations. Not surprisingly, pesticide resistance has built up in many insects and pesticides are frequently becoming ineffective. This in turn reduces the efficiency of environmental and health monitoring in the use of pesticides.

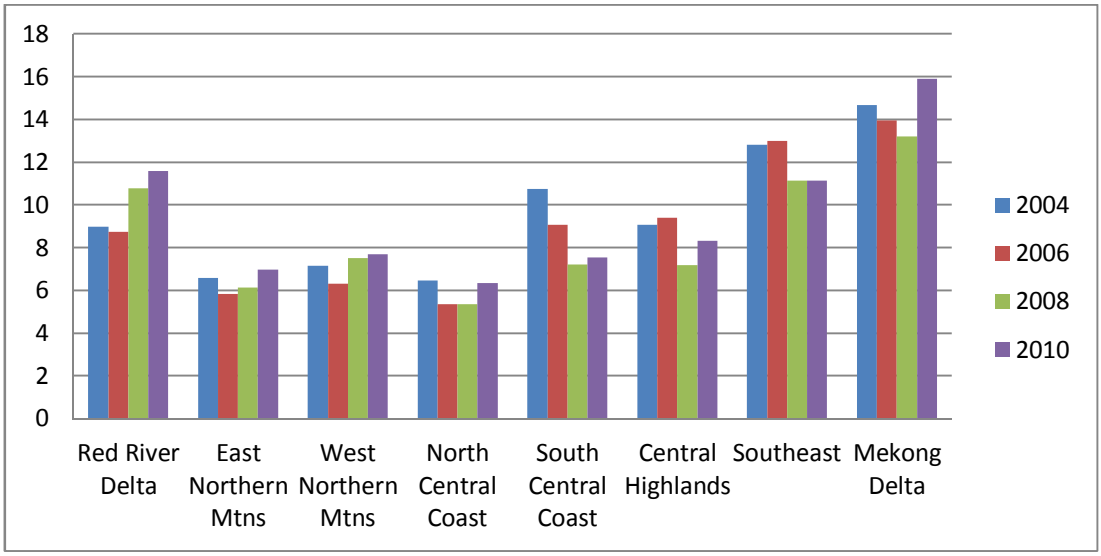

Figure 2-15: Average proportion of pesticide & herbicide cost 2004-2010

Source: Author's calculation from VHLSS 2004 to 2010.

A measure of actual pesticide used on-farm is difficult to obtain, as farmers use pesticides in a reactive, rather than proactive way. Farmers cannot afford to purchase large amounts of pesticides, and the main problem is the lack of appropriate application of the pesticide and the lack of withholding periods (ACI, 2002).

2.4.3 Government policy in rice sector

2.4.3.1 Land use policy

Under the Vietnam's constitution, land is the property which belong to Vietnamese people and the State administers it on their behalf. The Land Law 2003 states that government is the 'representative of the people's ownership' which also implies that individuals (or corporations) have only the land use rights, not the ownership (Marsh et al., 2006).

Regarding agricultural land, the government still keep a close control and actively regulate the use of this type of land. Farmers have rights in selling, renting,

exchanging, and inheritance their agricultural land plots by law, however, they do not have the right to decide about purpose of that land use for. Authorities (at central/national, provincial, district, and commune levels) directly intervene in farm households' choice of crops they have to grow base on production targets setting out (Markussen et al., 2009). Commune authorities are responsible for administrating the implementation of those restrictions basing on the commune's agricultural land use plan which is subject to approval at the district level. In principle, households can change their land use purpose (stated in their land-use certificate) by applying those changes to district authority. However, in practice, it is very difficult for households to change or remove restrictions on their land plots (Markussen et al., 2009).[18] The Land Law 2003 clarifies that changes in land use purpose are only allowed "within the existing physical planning framework adopted by central and local governments" (Vasavakul, 2006, Giesecke et al., 2013).

As a matter of fact, government's policies on agricultural land use put priority on rice production with concerns over the issue of national food security with a particular emphasis on self-sufficiency in rice production and rice price stabilization (Vietnam-Government, 2009a) (World Bank, 1998, Markussen et al., 2009). Besides food security reason remains a major motive behind restrictions, export targets are playing an increasing role. A key effect is that to achieve the export goal the government can restrict farmers to growing rice, one of the most important food exports. In Vietnam, a specific number of 3.8 million hectares of agricultural land has been stated as a target to be devoted to growing rice to assure the food security and export purposes until 2030 (Vietnam-Government, 2009b). This number represents about 90% of currently cultivated paddy land, or 35% of land used for agricultural crops (Giesecke et al., 2013). These restrictions are concentrated in the two regions of MRD and RRD, where the data indicates a much higher percentage at around 70% (see Table 2-15).

[18] For example, change from agricultural purpose to residential purpose.

Table 2-15: Land restricted for rice production at regional & national levels (2006)

Regions	Percentage of all land area for crop agriculture
North East and North West	17.9
RRD	74.9
North Central Coast	40.0
South Central Coast	23.4
Central Highlands	4.9
South East	9.6
MRD	68.3
Vietnam (average)	**35.3**

Source: Markussen et al. (2009), compiled by Ministry of Natural Resources and Environment (MONRE) based on the detailed 2006 National Land Use Plan.

In addition, the ability of farmers to make the most cost effective decisions are also affected by several factors including: (1) their awareness of land use opportunities and possibilities, and (2) the ability of farmers to respond to market signals (To et al., 2006). With full individual control rights and no restrictions, a simple rule for famers to follow would be that low profitability crops should be abandoned in favour of crops offering higher returns. However, even when the government no longer prohibits farmers from moving out of rice production, institutional issues still affect such movements and production decisions. Other constraining factors remain, not least of which is the long-term suitability of rice land for other uses and the small size of land plots that reduce the scope of alternative land uses. Where alternatives are available, such as fruit crops or shrimp farming in the MRD, the availability of investment funds may be limited and returns subject to long gestation periods (Purcell, 2006).

Not surprisingly the rice land designation policy with crop choice restrictions comes at the cost of productive and allocative inefficiencies. The land use policy affects agricultural productivity (and hence rural income and welfare) by improving the allocation of land and modifying its uses (McPherson, 2011). Production levels and economic returns vary according to both the type of land and land use patterns which are diverse across farm households due to different cropping patterns, technology adoption, input use level, and marketing. To et al. (2006) found that crop

diversification rather than only paddy growing could bring higher income and returns on land use if paddy farmers could shift to other crops in the absence of the designation policy. Markussen et al. (2009) and McPherson (2011) all argue that land use restrictions compelling farmers to growing rice tie or lock up significant resources (land, labour, physical capital, and finance) in low-value added agriculture. This reduces agricultural output and can affect the farm household's welfare. A possible explanation for these findings is that other crops or agricultural uses (for example, livestock, aquaculture, or fruits, vegetables, etc.) generate higher returns compared to rice cultivation when the rental price of the designated paddy land is lower than that available in other agricultural uses (Giesecke et al., 2013). As Vietnam continues to develop at a rapid pace, human resources may well be put to better use in the production of higher value added agricultural crops and work in non-farm activities.

As small-scale production and fragmented land area are considered to be obstacles to obtaining a better livelihood for rice growers in Vietnam, the government has focussed on promoting land exchange and accumulation. Its aim has been to establish large and modern commercial production areas that can benefit from economies of scale and from agricultural technology applications and mechanization. However, in reality, the land accumulation process is still slow and does not live up to the expectation of the government's policy. The lack of policies facilitating long-term and stable land allocation, lack of community consultation, and complicated transfer procedures are the reasons for the delay of land exchange and accumulation process (Tran, 2014).

2.4.3.2 Food security policies

Rice is a politically sensitive consumption good with respect to national food security in Vietnam (Nielsen, 2002, Tsukada, 2011). Given the essential role of rice, rice policies in Vietnam seek a balance among three dimensions: (1) maintaining domestic food security, (2) promoting rice exports for foreign exchange earnings and (3) improving farm income (Figure 2-16). Like many other developing countries with a large population, Vietnam faces the policy "trilemma" of compromising among these targets to secure sufficient rice in the domestic market, while also raising foreign exchange earnings from rice exports and increasing farmers' income.

The priority of each target interchanges over the years, but always aligns with the government's agricultural development strategy.

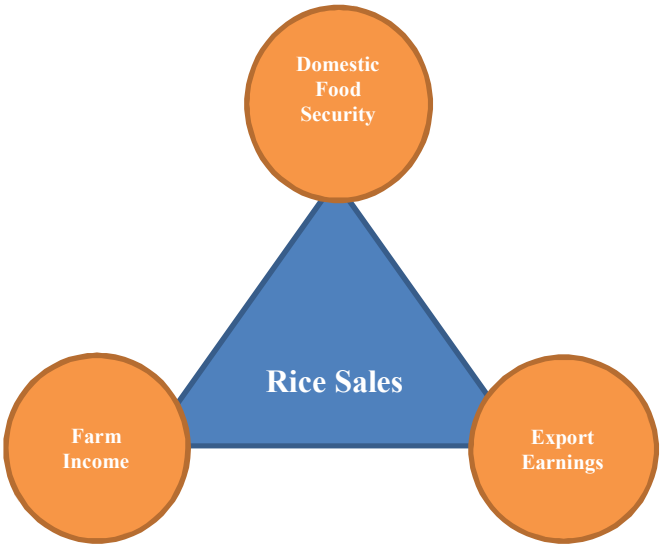

Figure 2-16: Triangle of rice policy dimensions

Being a populated, low-income, and long affected by wars, food security has always been the most important target of Vietnam's agricultural production and rural development. Since 1986, food security policies in Vietnam have experienced two phases of reforms: (1) first phase was emphasized on ensuring sufficient food supplies at national level, and (2) second phase focuses to achieve food surplus which allow for exports (Pham, 2010).

The need to ensure sufficient levels of rice production to meet domestic demand has directed the government's policies towards expansion of rice land areas and development of agricultural infrastructure such as irrigation systems. The government has also strictly controlled the conversion of rice-growing land areas into alternative uses by legislation.

When comparing total rice production and total rice consumption, since 1989 there would appear to be little need for concern about self-sufficiency in Vietnam in terms of ensuring an excess of the former over the latter. However, in Vietnam food security is not simply a matter of comparing rice consumption and rice demand with total rice output. Vietnam's current food security policies – which have been established at three different levels (national, regional, and household), embrace a much broader concept of food security than the traditional focus on food availability – highlighting concerns and goals related to food accessibility/affordability, child

malnutrition, food safety, and a more nutritionally balanced diet (Pham, 2010). In practice, the Vietnamese government's concerns are about the quantity of rice available in the domestic markets at a price affordable for the majority of the population. While the quantity of rice production cannot be affected instantaneously by policies, the quantity of rice exports can be controlled, and thus serves as the immediate policy target (Tsukada, 2011). For example, in the context of the global food crisis in 2008 when the international rice price spiked at very high levels, the government's ban on rice exports for three months, from late March to June 2008, was explained as a necessary measure for the nation's food security and stabilization of rice prices in the domestic market.

Over the past two decades, because of the success in raising productivity and land use intensity of its irrigated rice areas, Vietnam has become a large surplus rice producer, exporting nearly one-third of its production and accounting for more than 20% of the world's volume of traded rice. Furthermore, given rising income and urbanization, food consumption patterns have begun to shift to greater consumption of high calorific and nutrient food (such as fish, meat, fruits, and vegetables, etc.). The country's food security challenges therefore now relate more to nutritional balance, household income vulnerability, and consumer price volatility, than to national rice availability (Giesecke et al., 2013).

2.4.3.3 Rice-export policy

The Vietnamese government has maintained strict control over rice exports since 1989, the first year Vietnam became a net rice exporter after the "Doi Moi" policy. To do so, the government usually sets annual rice export targets or export quotas. These quotas are determined twice per year, at the beginning of the year and midyear, and are directly assigned to each export company, consisting of both SOEs and private companies that engage in rice export activities (Tsukada, 2011). Among these companies, the two national-level SOEs, Vietnam Northern Food Corporation (VinaFood I) and Vietnam Southern Food Corporation (VinaFood II) have been dominating players in executing rice exports (Kompas et al., 2014, Tsukada, 2011). By using a two-step allocation procedure for the annual rice-export quota, the government has secured itself a significant degree of flexibility to respond to the prevailing domestic crop situation: increasing when good harvests are projected and vice versa (CIE, 1998).

Export quantity controls were initially imposed through an export licensing system. SOEs had a complete legal monopoly over rice exports, with each of a limited group of SOEs granted a quota that specified the amount of rice it could export (Minot and Goletti, 2000). In 1998, reforms allowed for some private and foreign owned companies to engage in rice exports, followed by a simplification of the approval system for export businesses, which was in turn replaced by the current registration system. Minot and Goletti (2000) have estimated that domestic rice prices in Vietnam had been lowered by 22% through export quotas during the 1990s compared to equilibrium prices under a free trade scenario. However, empirical studies also prove that continued government intervention in the rice sector through export quotas and licenses reduces the earnings for rice producers, including the share received from rice exports (Young et al., 2002).

The export quota system was formally abolished from May 1, 2001, with the view to promoting competition among rice exporters and to expand their share in the world market. However, in reality, the annual total rice volume for export has been still strictly administered by government's authorities (Kompas et al., 2014). The government often set the annual target of rice export volume and assure export contracts implemented by enterprises not excess that imposed quantity. On the other hand, those quantity limits can be changed according to circumstances arise such as in case of either harvest failure or deemed food security reason (Kompas et al., 2014). In some cases, whenever the total quantity of contracted rice exports reach the annual target limit, the government even can suspend rice export activities (Tsukada, 2011).

Figure 2-17 illustrates the rice export management mechanism in Vietnam. Rice exports are currently managed by the Rice Export Management Board established in 2008 as a replacement for the steering committee for rice export and fertilizer imports. The mechanism for rice export management follows the below procedure:

(1) The Ministry of Industry and Trade, Vietnam (MOIT) sends the proposal on estimated annual rice export volume to the Prime Minister.
(2) The Prime Minster approves the proposal.
(3) MOIT circulates the approved proposal to Vietnam Food Association (VFA) and requires the VFA to monitor the export volume accordingly.

(4) VFA monitors rice exporters.

(5) VFA reports to the management board and the board reports to the Prime Minister if any problems arise.

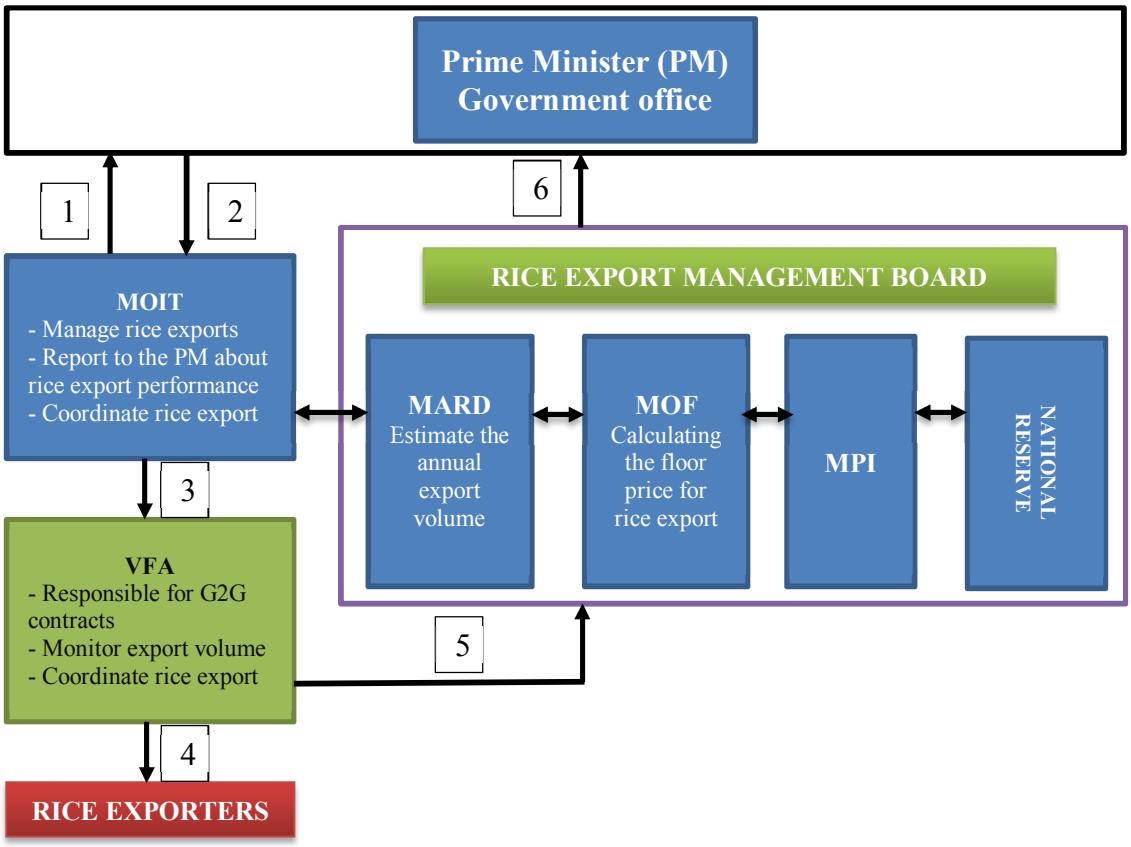

Figure 2-17: Rice export management mechanism in Vietnam

Source: (Tran et al., 2013)

There have been claims that the VFA, a professional association, is taking over the roles formerly managed by the government. The association is delegated the management of approving rice export contracts and setting the rice export price floor, as discussed above. Enterprises are required to register rice export contracts signed with foreign importers to receive the approval of the VFA before being able to undertake the customs clearance procedure for shipments delivery. This regulation has deterred non-member businesses from participating in the rice export activity and created an oligopoly in the rice trading market. That is, the VFA undoubtedly serves the interest of its members, in which VinaFood I and VinaFood II are the two biggest SOEs. Furthermore, with concurrent roles of setting the price floor for rice export and carrying out business with a profit maximizing purpose, VFA members have been accused of not being concerned about farmer welfare during unfavourable market conditions and high fluctuation of market prices. They can easily push back

the stress of price changing risk to rice farmers rather than lose their own commercial profit. The government policy of ensuring that farmers receive at least 30% profit in rice production has been bottlenecked, not only by constraints along the rice value chains, but also policy implementation as well.

2.5 CHAPTER SUMMARY

This chapter has showed that agriculture in general, and the rice sector in particular, plays a crucial role in Vietnam's economy in terms of contribution to GDP, employment, and export earnings. However, despite being a net rice exporter since opening the economy, Vietnam's rice sector faces various constraints such as the import-dependence of production inputs and high international competition. With more than two thirds of the population still living in rural areas and participating in various agricultural activities in which rice cultivation account the largest part, these constraints will certainly affect Vietnamese farmers' income and welfare during trade liberalization process. The discussion on interlinked issues of food security, farmers' income, and export earnings as well as management mechanism has provided a contextual and institutional policy setting Vietnam's rice sector.

Chapter 3: Literature Review

3.1 INTRODUCTION

This chapter reviews the relevant literature with a view to setting up a conceptual and contextual framework for the study. There are four areas of particular interest in addressing the welfare and poverty impacts of trade liberalization on Vietnam's agriculture and farmers. They include: (1) the way trade liberalization is managed through trade agreements; (2) available theoretical and empirical studies about the way in which trade liberalization and agricultural trade reform impacts on Vietnam; (3) the methods used to evaluate such impacts; and (4) value chain analysis and associated potential insights. It will be shown that while there have been several investigations into the questions raised in this dissertation, the methods used have limited sensitivity.

3.2 WELFARE IMPACTS OF TRADE LIBERALIZATION

The trade liberalization concept can be dated back to Adam Smith's theory of absolute advantage and David Ricardo's theory of comparative advantage in the 18th century. Smith (1776) argued that nations could accumulate wealth from free trade and specialization based on their absolute advantage deriving from productivity of labour. Following Smith's argument, trade liberalization became popular when David Ricardo proposed the model of comparative advantage in 1817 to explain how trade benefits economies with differences in opportunity costs of production. However, the effects of trade liberalization on development have been a subject of debate for centuries (Abbott et al., 2008, Chang et al., 2009, Nicita, 2004). Classical economists consider free trade an engine of growth, and that protection leads to a waste of resources, thereby adversely affecting economic growth (Chang et al., 2005, Chandran and Munusamy, 2009, Balassa, 1978, Krugman and Obstfeld, 2006). Critics argue that openness has its costs and could sometimes be detrimental to economic development (Rodriguez and Rodrik, 2001, Chang et al., 2009, Stiglitz and Charlton, 2005).

3.2.1 Trade Liberalization in the form of Trade Agreements

A trade agreement is a pact to reduce or eliminate trade restrictions such as tariffs, non-tariff barriers, or any measures that hinder trade flows between signatory countries (Feenstra and Taylor, 2008). There are different types of arrangements as reviewed by Plummer et al. (2010):

- A free trade agreement (FTA) is a commitment by signatory members to remove tariffs across member states while continuing to maintain independent tariff regimes on imports from outside countries (those who are not signatories to the agreement).
- A customs union (CU) goes one step further by uniting tariff regimes.
- Beyond a CU, a commitment to free flows of not only goods and services but also factors of production (i.e., labour and capital) is called a common market (CM).
- An economic union (EU) involves a common market with monetary union.

In practice, the borderlines between definitions are blurred. For example, several FTAs exclude agriculture and/or services but may include investments. Some CUs have so many exclusions to the common external tariff that they are more like FTAs that happen to have equal tariffs in some sectors. The European Economic Community was often called a common market when it was in reality little more than a customs union for the first 30 years of its existence. In reviewing the literature, the terms originally used by researchers are maintained even though this usage is sometimes inexact.

All of the above mentioned types of trade arrangements can be termed as regional trade agreements (RTA) as described by Goode (2003). In the WTO context, RTAs have both a more general and a more specific meaning: more general in that RTAs may be agreements concluded between countries not necessarily belonging to the same geographical region; more specific, due to the WTO provisions that relate specifically to conditions of preferential trade liberalization with RTAs. What all RTAs in the WTO have in common is that they are reciprocal TAs between two or more partners.

RTAs, in general, are different from each other in terms of content coverage and depth of preferential treatments (WTO, 2012).

> "Modern RTAs, and not exclusively those linking the most developed economies, tend to go far beyond tariff-cutting exercises. They cover increasingly complex regulations governing intra-trade (e.g. with respect to standards, safeguard provisions, customs administration, etc.) and they also often provide a preferential regulatory framework for mutual services trade. The most sophisticated RTAs go beyond traditional trade policy mechanisms to include regional rules on investment, competition, environment, and labour" (WTO, 2012).

3.2.2 Welfare impacts of Trade Agreements

Trading agreements such as FTAs have both positive and negative economic effects, which is why they are known as "second-best" initiatives. When the "first-best" option (i.e., multilateral liberalization) is unattainable, they provide an alternative vehicle for trade policy (Plummer et al., 2010).

The literature provides rich diversity of discussions on the economic impacts of trade liberalization in general and TAs in particular. In general, all studies focus on the agreement's impacts on trade flows or trade volumes, domestic and international prices, consumption, production, and welfare, as these are critical indicators of trade development.

For example, regarding impacts on trade flows, two recent papers have provided consistent estimates of the effects of RTAs on bilateral trade. Carrère (2006) found that RTAs have significantly increased trade among members, generally at the expense of other partners. However, the trade creation effect varies from one RTA to the other. Baier and Bergstrand (2007) proved that FTAs will in fact increase the members' international trade along the lines predicted by international trade theories. On average, an FTA was found to approximately double two members' bilateral trade after 10 years. Together, these papers suggest that country pairs self-selecting into RTAs may have different effects. The recent study of Vicard (2011) also supports the findings of the above papers.

Different analysts emphasize different outcomes of such agreements (Plummer et al., 2010). For instance, customs officials' major concern is the FTAs impacts on tariff revenue. The domestic business and industrial sectors are usually interested in impacts on domestic production, either at the aggregated or disaggregated level. The

impact on trade volume is sometimes emphasized by policy makers and researchers; however, this is only one aspect of an FTA. While their views do not usually fully reach the policy-making process, consumer benefits brought about by FTAs, namely a reduction in the import price, should not be overlooked. Economists usually emphasize the overall welfare and efficiency gains at the macro level (Plummer et al., 2010).

It is therefore important to choose the relevant evaluation methods based on the primary target of the analysis and carefully compare the benefits and costs of an FTA from various perspectives using different methods. As will be shown, the analytical focus in this work is on farm welfare effects following liberalization(s), with particular emphasis on enterprise profitability and farm household welfare.

3.2.2.1 Channels of impacts

Prachason (2009) considered that the potential impacts of trade liberalization on an agricultural sector could be projected via four main channels:

1) Tariff reduction/elimination: in most cases, parties aim to reduce or eliminate as many (commodity) items as possible and put as few items as possible into a sensitive list with a longer period before tariff reduction starts.

2) Standard regulations: this is one of an important non-tariff barriers that many developed countries have applied to limit the market access of agricultural exports from developing countries. Regarding agricultural exports from Vietnam, sanitary and phytosanitary standard (SPS) in developed partners prevents expected benefits from increasing agricultural export, as standards in these countries are high and strict.

3) Intellectual property rights (IPRs): in TAs or FTAs with developed countries, demand for developing countries to shift their governing regime towards stricter intellectual property rights is evident. The IPR provision usually asks the other parties to expand the property protection to cover plants, animals, and living organisms.

4) Investment liberalization: investment provisions are usually integrated into a trade agreement or FTA as trade and investment are seen to be

intertwined. Like trade liberalization, investment liberalization often requires applying principles of national treatment (NT) and reserves sensitive sectors in the temporary exclusion list, sensitive list, or general exclusion. Investments eligible for protection under the FTAs are also widely defined, including profits, intellectual property rights, license authorization, permits, etc.

Prachason (2009)'s view was based on the detailed contents and commitments of trade agreements among countries with trading blocs. These channels mostly mention the method of impact from a specific trade agreement to business aspects, whether they are bilateral or multilateral deals.

In their comprehensive work, Plummer et al. (2010) has pointed out that most existing studies concentrate on the economic impacts of tariff and non-tariff barrier elimination or reduction. This appears mainly due to data availability and methods to assess the impact of investment and services liberalization have therefore not been well established.

The effect of trade liberalization with changes in trade policy has two dimensions (Tonts and Siddique, 2011). The first is the effect due to liberalization in the domestic economy and the second is the effect due to liberalization in the rest of the world. The effect of the latter depends largely on the former. Regarding domestic trade liberalization, there are both direct and indirect effects. The direct effect refers to the effect of change in export, import, and related policy, while the indirect effect results from reforms in other sectors and the exchange rate. The actual impact of trade liberalization is reflected through changes in prices, production quantity, and the quantity of export and import.

Minot et al. (2007) divided the effect of changes in trade policy on a given country into two components. First, the "terms-of-trade effect" refers to the gains or losses associated with changes in world prices as a result of the policy. Most countries are too small for their trade policy to have a noticeable effect on world prices; however, global TAs can significantly influence world prices. Second, the "efficiency effect" refers to gains or losses associated with removing distortions by the policy in the country's own market. Unless there are significant externalities, a reduction in market distortions generally has positive efficiency effects. In other words, domestic market liberalization, to the extent that it reduces distortions in the

economy, will generate more benefits than costs on aggregate. Most studies of trade liberalization suggest that the efficiency effects are larger than the terms of trade effects.

Although trade liberalization has reduced barriers to trade in many other sectors, the agricultural sector remains highly protected in many countries (Minot et al., 2007). Various measures including tariffs, non-tariff ones such as technical barriers have been utilized to limit the impacts from import competition. Developed countries even apply direct subsidy program to support their farmers in both production (as input subsidy and domestic price support) and market access. Such protection has made agriculture a highly distorted sector and one of the most problematic areas in international trade negotiations (Minot et al., 2007).

While focusing on impacts caused by policy change on the agricultural sector, this study has taken into account the policies related to agricultural production and prices investigated in many previous studies. Some of these policies are listed in Tonts and Siddique (2011)'s study.

3.2.2.2 Methodologies for welfare impact assessments

As discussed, the theoretical framework for economic analysis of FTAs started with Viner's model (1950), which contains the fundamental concepts of trade creation and trade diversion. A major drawback of Viner's model is that it is only concerned with a single market (Plummer et al., 2010). Later models were developed to overcome this limitation by extending to the effects of an FTA in multiple markets (i.e. general equilibrium models) and relaxing Viner's assumptions (for example, the models of Meade (1955), Lipsey (1970), Wonnacott-Wonnacott (1982), and Lloyd and Maclaren (2004).[19]

Following the analysis of the static effects of FTAs/RTAs, various studies investigated the long-term, cumulative effects (i.e. dynamic effects) expected to occur after the creation of an FTA or RTA. Empirical studies have employed a range of techniques to investigate the effects of RTAs; however, the studies are based on two distinct methodologies. One relies on a simulation approach based on global

[19] For details of these cited studies see PLUMMER, M. G., CHEONG, D. & HAMANAKA, S. 2010. *Methodology for Impact Assessment of Free Trade Agreements,* Mandaluyong City, Philippines, Asian Development Bank (ADB) Publication.

general equilibrium models to analyse the economic effects of policy changes due to the formation of an RTA (ex-ante evaluation). The other method applies econometric approaches to historical trade data and assesses the impacts of the formation of an RTA on bilateral trade flows (ex-post evaluation) (Lee and Park, 2005, Plummer et al., 2010). This section only reviews the two distinct empirical approaches most commonly used in assessing the impacts of economic impacts of FTAs: the CGE model for ex-ante analysis and gravity models for ex-post analysis.

The simulation approach uses a static CGE model (Urata and Kiyota, 2005, Scollay and Gilbert, 2001, Brown et al., 1992), or a dynamic inter-temporal general equilibrium model (McKibbin, 1998, McKibbin et al., 2004). CGE models are computer-based simulations of future effects of a specified set of policy changes or different liberalization scenarios (Piermartini and Teh, 2005). This simulation approach has advantage in specifying the mechanism by which the formation of an RTA effect on the economy and usually finds substantial potential gains from trade liberalization between members of an RTA. However, in CGE model-based studies, it is unclear whether the member economies ultimately realized the potential effects (Piermartini and Teh, 2005).

A main benefit of CGE models is that they offer a consistent economy-wide framework for analysing trade policy questions (Piermartini and Teh, 2005). The two authors emphasized that the results of the models vary depending on what goes into the models by the way of structure and data. Choices among scenarios and model specifications can imply different results. They recommend using the numbers that come out of the simulations only to give a sense of the order of magnitude that a change in policy may imply for economic welfare or trade. However, the application of CGE models need to be under an important assumption. That is the Armington elasticity assumption of import demand. This assumption assumes imported intermediary inputs to be separable from domestically produced ones. And firms first decide on the sourcing of their imports; then, based on the resulting composite import price, they determine the optimal mix of imported and domestic goods (Hertel, 1997, Gumilang et al., 2010).

Robinson and Thierfelder (2002) reviewed a large body of empirical studies which used CGE model to analyse the welfare impact of RTAs. They found two general conclusions prevalent: (i) RTAs increase welfare of the member countries

and the rest of the world, and (ii) aggregate trade creation is much larger than trade diversion.

Although the CGE models have been influential in analysing the welfare effects of RTAs, the results of CGE studies are sometimes questionable because of their empirical limitations. The first limitation of the CGE studies is their prospective (ex-ante) rather than retrospective (ex-post) analysis (Krueger, 1999). Secondly, the sectoral aggregation does not allow analysis of specific markets. Policy information is often outdated, and baseline scenarios are unrealistic and based on older data (McKitrick, 1998).

The other approach uses the gravity model of bilateral trade flows. The model is based on the notion that trade between two countries, like the gravitational force between two masses, is a function of the countries' size (population or GDP), as well as the distance between them. Thus, the model estimates 'normal' trade flows, and then assesses whether the formation of an RTA will change the trade flows. Some notable studies include Aitken (1973), Frankel (1993, 1997), Braga et al. (1994), Bayoumi and Eichengreen (1997), Frankel and Wei (1998), and Dee and Gali (2003).[20]

A descriptive approach has also been undertaken to analyse the impacts of RTAs (Anderson and Norheim, 1993, Yeats, 1998, Dell'Aquila et al., 1999). These studies used various indicators to measure the regional concentration of trade. A study by Yeats (1998) provided empirical evidence of trade diversion in MERCOSUR. The descriptive approach implicitly assumes that the share of trade occurring with partner countries will not change in the absence of the agreement. This method depends on a static framework and the results are dependent on the level of aggregation. Consequently, changes in the terms-of-trade due to changes in the relative trade importance of members and non-members, as well as declines in the volume of trade for a single commodity included in the broader class, cannot be detected (Dell'Aquila et al., 1999). In addition, the descriptive approach lacks the ability to analyse trade creation and diversion effects, and hence, the welfare implications of RTAs. Econometric techniques have seldom been used to study the

[20] For details of these cited studies see LEE, J.-W. & PARK, I. 2005. Free Trade Areas in East Asia: Discriminatory or Non-discriminatory? *World Economy,* 28**,** 21-48.

effects of RTAs on trade in agri-food products. In particular, empirical researchers have paid little attention to incorporating the effects of RTAs into the specification of econometric models or to the estimation of the model by using pre- and post-RTA agri-food data.

3.2.2.3 Trade impact on welfare

Following pioneering work by Viner (1950), analysis of preferential trade agreements (PTAs) have been undertaken for more than six decades. The key concepts of Viner's model are trade creation and trade diversion, which remain central to the literature on static welfare analysis of preferential trading arrangements (Bhagwati et al., 1999).

Many investigators agree that the concepts of trade creation, trade diversion, and terms of trade effects constitute the welfare impacts of an RTA (Burfisher and Jones, 1998, Freund and Ornelas, 2010, Burfisher et al., 2004, Bhagwati et al., 1999). Trade creation refers to the increased trade within an RTA when internal tariffs are lowered or removed. Efficiency increases when a member imports more at lower costs from RTA partners, and domestic production that exhibit higher costs, fall. Trade diversion occurs when a member shifts its imports from more efficient, non-member producers, to less efficient partner countries within the RTA. RTAs are likely to have both trade-creating and trade-diverting impacts, and which effect will dominate depends on many factors, for example the initial economic structure (Burfisher et al., 2001).

Despite a number of recent contributions, the theoretical literature does not provide conclusive results on the net welfare effects of RTAs. As the net welfare effect depends on the relative magnitude of trade creation and trade diversion effects, it is an inherently empirical issue. Moreover, the net effect of trade creation and diversion may vary across commodities within the same RTA, between RTAs, and over time (Jayasinghe and Sarker, 2008). A growing number of studies have addressed the debate based on the welfare effects of RTAs and their likely impacts on the multilateral trading system (Krueger, 1999, Panagariya, 2000). One school of thought views RTAs as reducing global welfare and creating stumbling blocks to multilateral free trade (Panagariya, 1999, Bhagwati and Panagariya, 1996). The other school of thought argues that RTAs are likely to raise global welfare and can

act as building blocks to multilateral free trade (Ethier, 1998, Summers, 1991). Despite a number of empirical contributions in recent years, the effects of RTAs on trade in agricultural commodities and food products require more investigation.

The effect of RTA's on consumers is also important to consider. Trade creation benefits consumers because they can buy cheaper imported goods. Lower prices in effect raise the purchasing power of consumers' income, which may cause consumers to import more goods from non-member countries, and through this trade expansion, the RTA could even benefit non-members. Furthermore, when purchasing power is increased, consumers can also afford to buy a diversified variety of goods that potentially benefit their utility (Baier et al., 2011).

RTA's also have terms of trade impacts: changes in the supply of and demand for traded goods will lead to changes in export and import prices for both members and non-members (Burfisher and Jones, 1998). An improvement in terms of trade is economically positive for a country; it means a given level of exports buys more imports, which increases consumption and welfare.

Welfare is the sum of trade creation, trade diversion, and terms of trade impacts and is measured in terms of "equivalent variation", which measures the cost to consumers of the same bundle of goods, before and after entering an RTA. Welfare improves if the bundle of goods costs less as a result of the RTA, but deteriorates if the bundle of goods costs more (Burfisher and Jones, 1998). There are other sources of welfare gains from an RTA in addition to the static gains described here. RTA's can lead to dynamic gains if they stimulate investment, or if trade leads to productivity growth through the transfer of technologies, knowledge, and learning by doing. RTA's can also lead to a rationalization within industries, with fewer companies specializing in production for a larger market, while less efficient producers close down.

Existing literature has paid attention to economic welfare impacts of specific RTAs on countries, economic sectors, or industries. Many provide empirical evidence that supports the conclusion that trade liberalization has positive impacts and increases country-wide and sector-wide welfare (Egger and Larch, 2011, Taylor et al., 2010, Feltenstein and Plassmann, 2008, Karingi et al., 2005, Sandrey et al., 2011, Tovar, 2012, Cho and Diaz, 2011, Asafu-Adjaye and Mahadevan, 2009). Others have asserted that trade liberalization and TAs can either increase or decrease

welfare depending on the country-specific empirical context (Tovar, 2012, Anderson et al., 2004, Cherkaoui et al., 2011, Sandrey et al., 2011, Nicita, 2005). Some studies warrant a closer look.

Asafu-Adjaye and Mahadevan (2009) undertook an empirical investigation of the macroeconomic and sectoral impacts of two forms of RTAs compared with global trade liberalization on a small island country, using Fiji as a case study. Their results indicated that, overall, it is beneficial in terms of the main macroeconomic indicators such as real output, national welfare, and exports. Cho and Diaz (2011) developed a static applied general equilibrium model to use data from the Slovenian Household Expenditure Survey. They found that while trade liberalization led to falling consumer prices, increases in production in the export sector, and aggregate welfare gains, the differentiated welfare impacts across heterogeneous households varied. Egger and Larch (2011) chose to evaluate the trade, GDP, and welfare impacts of the so-called "Europe agreements" enacted in the 1990s between 15 EU incumbent and 10 potential entrants located in Central and Eastern Europe. Their results showed the effects on welfare were moderate in the EU15 but amounted to more than double-digit percentage changes when they involved the CEEC. In an assessment of the ASEAN-5 FTA, Feltenstein and Plassmann (2008) found that complete elimination of mutual import tariffs among the ASEAN-5[21] and the admission of China and the Republic of Korea into AFTA would bring larger welfare benefits than if trade liberalization only took place only among the five ASEAN countries. To examine the effects of tariff removal on consumers' welfare, Tovar (2012) focused on the Colombian automobile industry under the trade liberalization process. He showed that, as theory predicts, trade liberalization had a positive effect on Colombian consumers' welfare. Since tariffs were reduced, previously unavailable foreign cars were introduced into the market and car prices dropped. As a consequence, relative to pre-reform levels, consumers' welfare increased on average by almost three thousand dollars per purchaser.

The growing network of RTAs and previous rounds of GATT/WTO negotiations have dramatically reduced existing tariffs on industrial products. However, the same is not true for agricultural products, as the treatment of

[21] Including: Indonesia, Malaysia, Philippines, Singapore, and Thailand

agriculture within RTAs and the WTO is more complex than other sectors, and varies widely across agreements (Jayasinghe and Sarker, 2008). Following the Uruguay Round's Agreement on Agriculture (URAA), agricultural trade protection has gradually been reduced. However, agricultural products still enjoy some trade protection benefits under the special safeguards - the amber-box and blue-box provisions of the URAA. These provisions complicate agricultural trade liberalization, as many countries rely on trade barriers to provide domestic support. The average preferential tariffs for agricultural products are therefore still high in a number of RTAs. These conditions create a trading environment for agricultural products that is different from that for industrial goods (Jayasinghe and Sarker, 2008).

Sadoulet and de Janvry (1992) reaffirmed the result from studies edited by Goldin and Knudsen (1990), which were generally consistent in predicting that liberalization would lead to higher world market prices for cereals and animal products. They focused on low income Asian and African countries.[22] In the short-run, the effects of rising world prices of cereals and animal products in terms of social cost measured by changes in real income, is spread over all social classes in the countries in which cereal imports are not competitive with production. Losses are regressive in agriculture because small farmers produce animal products whose prices fall, while larger farmers are more engaged in agro-exports whose prices rise. In the urban sector, the poor lose little because the rise in food prices is small. The rich lose from the slowdown in economic growth.

However, the impacts on the other two groups contrast sharply with those impacts on the first group. While the response in Africa was to increase agricultural trade through a higher cereal import bill and larger exports of agricultural goods, the response in Africa II and Asia was to reduce trade through cereal import substitution and declining agro-exports.

In terms of social effects of rising world prices, Sadoulet and de Janvry (1992) found differences between the two contexts they used in their study, Asian group and African II group. In Asia countries, large farming producers gain as the increase in

[22] They investigated three groups of countries: (1) African countries with non-competitive cereal imports (Africa I); (2) African countries with competitive imports (Africa II); and (3) Asian low-income countries (not including China and India);

food crop prices is much higher than the decrease in agro-export prices and most of those producers' food surplus is for commercial purpose. Small farmers and landless are loser as they are net buyers of food at higher price. In Africa II group, real incomes of all farmers, regardless large or small, are reduced due to agro-export's prices fall while there is a relatively low increase in food price in domestic markets. In this group, medium farmers are the most affected people because of being net food buyers as well as main producers of agro-exports. In general, the two authors found similar results of negative impact on real income of rural and urban poor in both Asian and African II groups. The urban rich generally have little impact from rising food prices as their food budget share is low, but they are negatively affected by employment reduction which linked to falling government expenditure (Sadoulet and de Janvry, 1992).

With regards to the analysis of welfare impacts on agriculture, a number of studies have attempted to investigate the effect on agriculture in less developed and developing countries. Taking rural welfare in less developed countries (LDCs) into account, Taylor et al. (2010) found evidence that reinforced the view that agricultural trade reforms that eliminate import tariffs on agricultural commodities negatively affect rural welfare in LDCs. Their argument was based on two considerations. First, many rural households produce grains, the product that developed countries have comparative advantage in production. Reduction or elimination of protective measures against grain imports thus leaves the rural economy vulnerable to competition from foreign grain producers. Furthermore, generous subsidy programs for grain farmers in developed countries also contribute to welfare losses of LDCs rural economy. Second, the effects of agricultural trade liberalization in developed countries are negligile as in many cases LDCs already have preferential access to these markets for their agricultural exports. Therefore, LDCs stand to gain less (in terms of increasing access to high-income markets) than they lose (by exposing their producers to foreign competition) from the liberalization of the agricultural trade. In fact, some LDCs may lose from trade liberalization as a result of preference erosion (Tangermann, 2005).

Two notable studies researched the effects of trade liberalization on agriculture in the Southern Cone Common Market (MERCOSUR)[23] with different conclusions. Sandrey et al. (2011) investigated the welfare impact of an FTA between the South African Customs Union (SACU)[24] and MERCOSUR using the GTAP database. They found there were reasonable welfare gains for South Africa that stemmed from a better use of land, labour, and capital (enhanced allocative efficiency). However, terms of trade deteriorated and the overall impact of an FTA with MERCOSUR was not favourable for the South African agriculture sector. Imports of agricultural products increased dramatically, mostly in terms of increased imports of secondary (processed) agricultural products, while export gains were modest. Furthermore, there were marginal reductions in the prices of all agricultural products, which benefited consumers but could harm domestic producers. The second study by Korinek and Melatos (2009) provided an in-depth examination of the trade effects of three RTAs – the ASEAN FTA (AFTA), the Common Market for Eastern and Southern Africa (COMESA)[25], and the MERCOSUR – on the agricultural sector. Results from a gravity model suggest that the creation of AFTA, COMESA, and MERCOSUR increased trade in agricultural products between their member countries. They also found that the agreements produced net trade creation, with no robust indication of trade diversion with respect to imports from outside the region.

The variable direction of trade liberalization impacts on agricultural welfare is reflected in the observations of Taylor et al. (2010):

> "The microeconomic agricultural household theory suggests that the effects of agricultural market liberalization on LDC rural welfare are not clear-cut because rural households lose as producers but gain as consumers when food prices fall. Whether the negative production or positive consumption effect dominates is an empirical question, and the answer is likely to vary between different rural household groups. On the production side, a decrease in price (for example, of food grains) may benefit households engaged in other crop activities (for example, fruits and vegetables) if factor prices (for example, wages) decrease. Even the impacts of agricultural trade reforms on factor prices

[23] Including 5 full member states: Argentina, Brazil, Paraguay, Uruguay, Venezuela; and 5 associate states: Chile, Bolivia, Colombia, Ecuador, Peru.
[24] Including: Botswana, Lesotho, Namibia, South Africa, and Swaziland.
[25] Including 19 countries but their FTA created in 2000 includes only 13 members (see http://www.comesa.int/ for details)

are ambiguous; they depend on the relative factor intensities of the directly- and indirectly-affected activities".

In other words, the impact of trade liberalization on household welfare and farmer's welfare has been widely and inconclusively debated: impacts vary with mixed and/or ambiguous effects typically present.

3.3 WELFARE AND POVERTY IMPACT OF TRADE LIBERALIZATION – STUDIES ON VIETNAM

3.3.1 Types of studies and issues of focus

Many studies have examined *ex-ante a priori*[26] expected impacts of trade liberalization on Vietnam's economy in general and agricultural sector in particular; however, only a few *ex-post* empirical studies have been undertaken, which may be due to the fact that significant liberalizations have only occurred recently. Generally, studies focusing on Vietnam's liberalization and integration process can be categorized by model usage into four groups:

- The first group applies CGE models to simulate the expected economy-wide effects of changes in tariffs and subsidies. As mentioned in previous section, CGE models provide a framework for economy-wide analyses, taking into account existing relations among the different sectors, factor markets, households, and the government. In their in-depth study, Abbott et al. (2007) provided a critical review of most prominent studies using CGE models that simulate Vietnam's trade liberalization impacts. They highlighted that although CGE models can offer economy-wide framework for analysing trade policy issues the results of the models are sensitive to key assumptions and can be manipulated to yield 'desired' outcomes. Common assumptions underlying CGE models such as Armington elasticity assumption, perfect competition, and specific behavioural assumptions have been

[26] *A priori* is a Latin phrase often used in trade analysis with mean of "from the earlier or former" to denote a method of projecting future consequences of a policy change. In this method, consequences are presupposed and known before the event. *Ex-ante* and *ex-post* are two opposite phrases (in Latin means "before the event" and "after the event", respectively). The *ex-ante* analysis approach involves projecting future effects of a policy change, answers "what if" type of questions. The *ex-post* approach uses historical data to measure effects of past trade policy PIERMARTINI, R. & TEH, R. 2005. Demystifying Modelling Methods for Trade Policy. *WTO Discussion Paper No.10.*.

widely criticized in the literature as too restrictive or unsatisfactory with the reality. Furthermore, comparison between expected and actual outcomes after major episode of trade integration also tend to show that CGE models do a rather poor job at predicting the sharply increase in exports occurring in sectors that initially did not trade much with the rest of the world (Abbott et al., 2007). Piermartini and Teh (2005), therefore, emphasize that ex-post validation of past results of CGE models needed to increase confidence in the results.

- The second group of studies applies a partial equilibrium (PE) models. These models do not take into account multiple linkages among markets and activities and based on information of specific sectors as well as the economic actors who participate in them. As an example, a study by ISG-MARD (2002) applied a partial equilibrium model to quantify the impact of the different policy options and situations of Vietnam's economic integration and trade liberalization on four agricultural sub-sectors. These sectors were divided into two groups: the exporting group (rice, coffee, tea) and import substitution group (sugarcane). The simulations took into account three scenarios of tariff reduction under the world tariff barrier, AFTA, and Vietnam-US bilateral trade agreements. All of the scenarios produced clear indications of a positive impact on the exporting group in terms of increasing both export prices and volumes as compared to the base scenario. In terms of sugarcane, without financial support and trade barriers (import tariff) imposed by the government, this sector is shown to be unable to sustain self-sufficiency. Both first and second groups of models use price as the single significant independent variable for ex-ante analysis the impacts of trade policy changes during process of trade liberalization. However, this focus might be misleading as price changes as results of tariff changes in Vietnam are not large and factors other than price should be included to explain better the exports surge (Abbott et al., 2008).

- The third group includes a number of qualitative analyses such as those of Nguyen (2004) and Vo (2005). These studies contribute in the way

of providing Vietnamese perspective on the integration process and contextual socio-economic framework which needed for evaluate future effects. They focus on discussing issues and challenges, but refrain from more precise quantitative estimates.

- The last group is empirical studies using regression and like models, such as the gravity model, to analyse various aspects of economic impacts of trade reforms and trade liberalization. After the event ex-post approach investigation of trade liberalization activities can be seen as a complement to ex-ante analysis of CGE models (Kehoe, 2003 recited from Piermartini and Teh (2005)) . Empirical chapters of this dissertation are of this group as they attempt to estimate the impacts of Vietnam's international integration activities during 2000s by utilizing series of household survey datasets combining with value chain analysis of a specific sector, rice. For a range of reasons that will be explained, this dissertation follows the assumption of there is a "mixed" pass-through effect in Vietnam's rice value chain. Local farm-gate price on offer matters because most of Vietnamese rice farmers are small producers with no storage capacity hence they are price takers in the value chain and also in the sense that they have no influence of final destination of rice they sell. Government's interferential policies and the limitation of farmers' awareness of price and payment at the price are considered as reasons for incomplete price transmission along the value chain. Border price may not be transmitted "as is" to farmers and the supposed signal is not then received.

3.3.2 Welfare impacts assessment

The influences of trade liberalization on household welfare and poverty have been one of the main interests in development economics for the last twenty years. There is a wide consensus among economists that in the long run, free trade generates aggregate welfare gains through positive impacts on economic growth and poverty. Studies indicate that the relationship between trade liberalization, welfare, and poverty is largely case and country-specific (Cho and Diaz, 2011, Minot and Dewina, 2010, Niimi et al., 2004, Bhagwati and Srinivasan, 2002). To measure the

effects of trade liberalization on poverty and household welfare, Winters (2002a), Winters et al. (2004) proposed a conceptual framework where trade liberalization reaches households through three channels: price, employment, and government fiscal policy. This framework has been widely applied by various studies to investigate the relationship. Chapter 4 of this dissertation will discuss in detail Winters' framework which is applied empirically in Chapter 6.

Some other studies have attempted to examine what the welfare impacts of trade liberalization in general, and FTAs in particular, would be on the Vietnamese economy. One of recent studies from Fosse and Raimondos-Møller (2012) predicted that the Vietnam's WTO tariff reduction scheme for the period of 2007-2014 would reduce overall welfare. Moreover, the simulation results from the study's CGE model showed that the biggest loss would take place among the poor rural households. Taken in to account the domination of state-owned enterprises (SOEs) in Vietnam's economy, the two authors showed that if SOEs behaved as profit maximizers, the trade liberalization effects (in terms of WTO tariff reduction) would both increase aggregate real income and reduce income inequality. In reality, due to SOEs acted as revenue maximizers thus employment the WTO tariff reduction will have opposite effects: reduce aggregate income and increase income inequality. In an earlier study, Nguyen and Heo (2009) also applied the CGE model for scenarios of the WTO tariff reduction in Vietnam case but under assumption of no behavioural distortion, i.e. all firms (including SOEs) are profit maximizers. And the simulation results show that Vietnam would benefit from the tariff reductions that follow WTO accession. This gain is illustrated by an increase in GDP, overall welfare gain, consumption, etc. In all of the scenarios investigated in this study, middle-income and high-income household groups gained, whilst for the poorest groups, the rural population gained and the urban population lost.

In an attempt to assess welfare impacts of the ASEAN-China FTA (ACFTA), Vanzetti et al. (2011) use the global CGE model (GTAP model) to find that Vietnam's economy would gain from this FTA through better use of resources (allocative efficiency), using resources that were previously under-utilized (endowments), and more favourable terms of trade when tariff and non-tariff barriers were reduced or eliminated. In comparison with the FTA impacts on another ASEAN

member, Indonesia, the study shows Vietnam obtained a greater protective effect with its tariff reduction following the FTA implementation.

3.3.2.1 Impacts at the sectoral level

The effects of trade liberalization on sectors within an economy will vary depending on its production structure and whether they are import-competing or export-oriented ones (Nguyen and Heo, 2009). Regarding impacts on agricultural sector and sub-sectors, Nguyen and Heo (2009) found that rice sector is one of losing sub-sector in Vietnam's agriculture due to the decrease in output and export is much higher than increase in imports while domestic demand rises rapidly.

Harris et al. (2007) evaluated the economy-wide impacts of trade liberalization on Vietnam in the AFTA context by applying a multi-region, multi-good, dynamic growth CGE model. They found that the bilateral removal of tariffs provided highly beneficial effects to Vietnam. Trade liberalization caused a large fall in wage inequality, thus increasing the welfare of unskilled workers in the country. Authors also found evidence of a shift away from agriculture towards low-tech and immediate manufacturing sectors, thus further emphasizing Vietnam's shift from a pre-dominantly agricultural economy to that of a manufacturing one.

To (2010) confirmed the result of marginal gains of welfare for Vietnam and other members of FTAs in the East Asia region. Her empirical results revealed that regional trade integration has strong impacts on many sectoral outputs in Vietnam. Some sectors find new opportunities to expand their output (for example, rice), while others face competition and contraction (such as the food processing industry or petroleum). In various scenarios of the CGE model, Vietnam's manufacturing sectors expanded due to an increase in the output of textiles, garments, leather products, and machinery. It was shown that agricultural production would expand if rice was liberalized, but would contract otherwise.

3.3.2.2 Impacts at the household and farmer levels

Nguyen and Tran (2006) also employed the CGE model for Vietnam to evaluate welfare impacts of trade liberalization, not only on aggregate, but also on different household groups identified in the model. Their results showed that there was a modest but significant efficiency gain (in terms of aggregate welfare measures)

to the Vietnamese economy from the combined tax (e.g. VAT) and tariff reforms under AFTA and WTO commitments. However, trade liberalization was 'pro-rich' when it was accompanied by redistribution away from the rural and poor households in general. The richest groups gained, while the middle-income groups generally lost. The poorest households also benefitted, but by half as much as the richest households.

From a different perspective, Coello (2009) aimed to identify how trade liberalization had impacted the production of export crops. She focused on the link between trade liberalization and farmers' specialization in exported cash crops and found that not all Vietnamese agricultural households would gain from export liberalization; it would depend on the level of specialization. The study estimated that a decrease of 1% in tariffs faced by Vietnam exports abroad would result in a 0.17% increase in household cash crop production relative to the level in 2002. However, households who entered the export market were those who benefitted the most. Alternatively, households who quit the export market and stayed in the agricultural sector were those who were worse off and not able to find other compensating sources of income.

Pham et al. (2008) measured the effects on the welfare of Vietnam's small livestock producers by developing a link between the household model and the GTAP trade model. Their results were not surprising when showing positive impacts of trade liberalization on the studied sector and that the largest benefit that households could have was if full trade liberalization occurred across the world. In this case, the welfare of the household was dominated by the effect of household's labour allocation between off-farm and on-farm jobs, rather than the increase in production profit and consumption on commodities only.

The question of how trade liberalization affects household welfare, income distribution and poverty in a developing country with a large rural economy in the presence of an imperfect labour market, has been examined by Seshan (2005). He examined the ex-post impact of liberalization of Vietnam's largest sector, rice, on household welfare during the period from 1993-1998. In general, the research results point to a modest increase in average household welfare for Vietnam, though this masks clear differences between rural and urban households. Particularly, rural households in fact experienced an increase in their welfare. Among rural across the

income distribution, poor households gaining more as a fraction of their initial real income, relative to better-off ones. In contrast, among urban households, the poorest households have been the hardest worse-off while on average urban households only experienced a marginal drop in their welfare (Seshan, 2005).

3.3.2.3 Impact of prices volatility on farmer's welfare

Minot et al. (2007) pointed out the opposite effect of trade liberalization on world price comparing with domestic price of agricultural products. In general, global trade liberalization results in higher international prices for goods subject to protectionist policies and subsidies (Minot et al., 2007). This is because the elimination of import tariffs increases import demand, while the elimination of domestic subsidies reduces supply. As agricultural products are subject to higher rates of protection and (in developed countries) large domestic support programs, trade liberalization is expected to increase world agricultural prices. This is particularly true for the products for which the markets are more distorted, such as wheat, rice, sugar, cotton, and dairy products. Higher agricultural prices may worsen the terms of trade of net importers of agricultural products while benefiting net exporters of agricultural products.

Regarding effect of trade liberalization on domestic producer prices, this impact is subject to two factors: (i) changes in international prices, and (ii) changes in the level of agricultural protection within a country (Minot et al., 2007). As countries eliminate agricultural trade barriers, imports of formerly protected commodities expand, pushing down domestic agricultural prices. Thus, multilateral and unilateral trade liberalization generally has the opposite effect on domestic agricultural prices.

Various studies have shown that international economic integration and trade liberalization often raise prices of agricultural products (Schneider and Kernohan, 2006, Sadoulet and de Janvry, 1992). This effect of trade liberalization will certainly have an impact on households and farmers' welfare.

In studying Vietnam's agriculture, Vu and Glewwe (2011) found that increases in food prices raised the real income of net sellers of food, but reduced the welfare of net food purchasers. According to the two authors, overall, the net impact of higher food prices, especially rice prices on the welfare of an average Vietnamese

household in the years between 2008-09 was positive. However, the benefits and costs were not spread evenly across the population and were regionally differentiated. In total, in rural areas middle-income households gained the most, while the poorest households gained the least from higher rice prices. In urban areas, the poorest households lost the most (in percentage terms) from an increase in rice prices. An interesting result from their study is that while the Mekong River Delta (which produces about 90% of Vietnam's marketable rice) gained greatly from higher rice prices, only about one-third of the households in this region were better-off.

Kompas et al. (2010) also focussed on Vietnam and applied the CGE model using the GSO input-output table for 2005 and a micro-simulation (using VHLSS data of 2006) to analyse the recent dramatic increases in the world price of rice on the regional economy of Vietnam. Kompas et al. (2010) study showed that recent rice export quotas resulted in falls in total rural savings and as the second biggest rice exporter in the world, an increase in world rice prices was a potential benefit to the country as a whole.

In a more recent study, Niimi (2007) examined the effect of trade liberalization on household welfare from rice price changes through the price channel in the context of Vietnam's experience during the 1990s. The author used the data of the VHLSS 1992-93 and 1997-98 and applied the Deaton methodology for estimating price elasticities in the absence of adequate market price data. The study found that the welfare impact of liberalisation induced rice price changes which were not as severe as would have been the case if a large share of households had not been engaged in rice production in Vietnam. Niimi (2007) thus argued that, if implemented appropriately, trade liberalization could be an effective policy tool to reduce poverty.

Most CGE models combine household data with industry data. The data allowing disaggregation at the household level is contained in the Vietnam Living Standard Surveys (VLSSs) including the surveys of 1992-93 and 1997-98 and a number of earlier years during the 2000s (for instance 2002, 2004, or 2006, which named Vietnam Household Living Standard Surveys - VHLSSs). These surveys contain a detailed breakdown of income sources and expenditure patterns for about 6,000 households (for the VLSSs group), and 9,189 households for the 2000s' group.

The VLSS/VHLSS data contains a wide range of information, including health employment, migration, housing, fertility, agricultural, forestry, and fishery activities, non-farm self-employment, food expenses and home production, non-food expenditures and durable goods, income from remittances, borrowing, lending and saving, and anthropometric measures. The industry data used in most studies are the 1996 Input-Output (I-O) table, with indicators for 97 sectors. Jensen and Tarp (2005) and Truong and Nguyen (2009) used the 2000 I-O table. Some papers have been calibrated to new industry data, using new data in the structure of one of these two I-O tables. The I-O table provides information on the links among sectors, the source and use of economic resources, and various other macroeconomic flows. In the papers reviewed, industries are aggregated into 9-33 groups.

Other CGE models on trade are based on the Hertel (1997) Global Trade Analysis Project (GTAP), which involves basic accounting relations that track value flows through the global database. The national database for Vietnam in the GTAP database is based on a 1997 Social Accounting Matrix (SAM) constructed from the official Vietnamese 1996 I-O table. Compared to the SAM, the GTAP includes the specific trading partners, while the SAM simply includes the rest of the world as one account. The GTAP uses the same structure for all countries, i.e. the aggregated same sectors, which may create an issue, as different sectors are important in different countries.

Despite criticism that the CGE models employ random and questionable parameters values (Panagariya and Duttagupta, 2001, Schiff and Winters, 2003), sensitivity analysis indicates that the general conclusions derived from CGE studies are robust to a reasonable variation in parameter estimates (Burfisher et al., 2004). In conclusion, while carefully considering these caveats, CGE models can provide a very useful tool in analysing the economic impacts of trade liberalization, FTAs and RTAs. As the CGE (GTAP) model incorporates both direct and indirect effects of tariff reductions, including the sectors not directly targeted in the tariff reduction, on the whole, output change seems to be marginal.

3.3.3 Trade liberalization and poverty impacts

Most economists accept that, in the long-run, open economies fare better in aggregate than closed ones (Winters et al., 2004). This is because in the long-run, the

economy may gain in competitive power and become better off in terms of average incomes. However, in the short-run, due to the lack of endowments of small and poor farm households which can protect them against external shocks and uncertainties, trade liberalization may harm these actors.

Trade openness is widely thought to benefit countries as a whole (for example, via GDP growth); however, how trade liberalization affects on household welfare and poverty in developing countries has been intensively studied producing mixed empirical results. A variety of studies have investigated this topic using cross-country regressions (Manole and Spatareanu, 2010, Caselli, 2012, Chang et al., 2009, Milanovic, 2005, Dollar and Kraay, 2002, Dollar and Kraay, 2004, Lundberg and Squire, 2003, Rama, 2003, Edwards, 1998, Edwards, 1993). However, country-level data misses valuable within-country variation. A group of other papers analysed the topic by utilizing an agricultural household model developed by (Singh et al., 1986a) and others (Deaton, 1989, Minot and Goletti, 1998, Porto, 2006, Porto, 2003, Balat et al., 2009).

Recent studies exploring the poverty dynamics and welfare impacts of trade liberalization in Vietnam include Glewwe et al. (2002), Litchfield and Justino (2004), Niimi et al. (2004), and Justino et al. (2008). They all examined households' poverty dynamics in the 1990s using the Vietnam Living Standard Surveys (VLSSs) of 1992-93 and 1997-98 - the first two data sets in a series of Vietnam General Statistics Office's household living standards surveys which have been continued until the present. In his research on a similar topic, Hoang (2012) applied the Justino et al. (2008) methodology using data from the VHLSSs from 2002 to 2008 to examine the dynamic changes in Vietnamese poverty in the first decade of the 21st century. They then compared the results to research from the 1990s panel data sets. A recent study of Le (2014b) focused on the linkage between institutional reform that accompanies trade liberalization and Vietnamese rural households' welfare. In this study, the author used only the separate cross-sectional datasets from the VHLSSs in 2006 and 2010 to compare changes overtime. There are still very few studies that have been carried out on all aspects of dynamic welfare at the household level, especially utilizing the advantages of VHLSSs' panel datasets from the year 2002 until the most recent published data set of 2012.

Many studies have employed micro-level data to analyse trade liberalization impacts on household welfare or poverty in developing countries (Justino and Litchfield, 2003, Litchfield and Justino, 2004, Isik-Dikmelik, 2006, Justino et al., 2008). Most of these examined the effects through a transmission mechanism proposed and widely applied in Winters (2002a). According to this mechanism, trade-induced effects can be traced through three main channels: (1) the price channel - the impact on household's earnings (through factor markets); (2) the employment channel; and (3) the fiscal channel - the impact on the public sector (changes in government's revenue and spending). However, due to data unavailability for the third channel, most studies have only concentrated on the first and second channels.

Regarding the price channel, some typical previous studies have examined the impact of the rice price in Vietnam in the 1990s. For example, Minot and Goletti (1998) found that trade policy reforms such as relaxing then removing rice export quotas and removing fertilizer import quotas increased the rice price (both farm-gate and retailed prices), and therefore helped improve rural welfare in terms of average income, as well as slightly decreasing poverty incidence. Justino et al. (2008) provided evidence of the significant contribution of retail rice price increases to the higher household's consumption expenditure and higher possibility of escaping poverty. In their study, Niimi et al. (2004) also showed similar results of the link between gradual trade liberalization during 1990s with the poverty reduction and household welfare enhancement.

Regarding the employment channel, trade liberalization and employment does not seem to have a straightforward relationship. The neoclassical standard Heckscher - Ohlin (H-O) theory predicted that freer trade would lead a developing country (assumed to have abundant unskilled labour and scarce skilled labour) to specializing in a sector that uses its unskilled labour intensively and then raises labour demand in the latter sector. In accordance with the H-O theory, Stolper-Samuelson's (S-S) theorem (1941) argued that the increase in the relative output prices of unskilled-labour-intensive goods relative to skilled-labour-intensive goods would translate into a rise in the relative wages of unskilled labour, reducing the wage gap (or skill premium) between the two groups of workers. Fukase (2012) found different results in contrast to Goldberg and Pavcnik (2007) when showing the existence of a Stoper–

Samuelson (S-S) type effect in a Vietnam case study. Focusing on whether the Vietnam-US bilateral trade agreement in 2001 provided evidence of the Heckscher–Ohlin–Samuelson (H-O-S) theory or not, her findings demonstrated the existence of a "Stolper-Samuelson type" effect. More specifically, according to her study, those provinces that were more exposed to the increase in export opportunities experienced a larger wage growth for unskilled workers and a decline of (or smaller rate of increase in) the relative wage of skilled and unskilled workers relative to the other provinces. In the previous study, Goldberg and Pavcnik (2007) found that the H-O-S theory was inconsistent with the empirical observation that many developing countries had experienced increased rather than decreased skill premium after the implementation of trade liberalization. Thus while Goldberg and Pavcnik (2007) conclusions were mainly drawn from evidence on import liberalization, Fukase (2012) were based on export liberalization resulting from policy changes by a countries' trading partners, which would affect skill premium in developing countries.

Another study on Vietnam, Niimi et al. (2007b) indicated that employment growth in the top export commodity sectors (such as seafood, furniture, garments and textile, footwear) was a direct result of trade reform (in light of import liberation and export). In another study, Jenkins (2004) argued that despite the rapid economic growth, extensive economic reform increased openness and a significant reduction of poverty, the rate of industrial employment growth is slow. Her study quotes a specific number of 100,000 new jobs created as the net employment effect of trade liberalization in the period of 1990-1994, and under 300,000 for the period of 1995-1999.

3.3.4 Multidimensional poverty and relation to income poverty

It has been widely acknowledged that deprivation is a multifaceted concept and it not enough to look only at income poverty (Atkinson, 2003). Measurement of poverty has become one of the most concerns in poverty research since the Sen's pioneering article (Sen, 1976). His well-known critique of the head-count and poverty-gap indices of poverty has resulted in the emergence of academic interest on conceptualizing poverty measurement (Tsui, 2002). The general move has been away from the view of income as the sole measure of poverty in search of other indicators

that provide more accurate picture of deprivation situation (von Maltzahn and Durrheim, 2008).

There is a growing interest in the measurement and analysis of multidimensional poverty in recent literature on poverty in which effort from Oxford Poverty and Human Development Initiative (OPHI) has been a notable contribution (Mahadevan and Hoang, 2016). The estimates of multidimensional poverty index (MPI) developed by OPHI is a direct method that complements income poverty analyses in the developing countries by considering information from a different angle, focused directly on actual deprivation.(Alkire and Santos, 2014). Furthermore, there is widespread agreement that reduction of income poverty, an important aspect of multidimensional poverty, is necessary but not sufficient for sustained development and growth for developing countries, which have been successfully in income poverty reduction (Mahadevan and Hoang, 2016). This section will review some of the most recent and typical studies on MPI and taking Vietnam as a case study.

The first study by Baulch and Masset (2003) used transition matrices based on data from Vietnam Living Standards Survey (VLSS) of 1992/93 and 1997/1998 to explore how is the correlation between monetary income poverty and nonmonetary indicators (including child stunting, adult malnutrition, and children's school enrolments and achievements). Their results show a weak association between monetary and those nonmonetary indicators. In a different manner, Asselin and Vu (2009) has computed an aggregate multidimensional deprivation index and the aggregate consumption poverty index in 1992, 1998, and 2002. However, their comparison over the three-year data did not provide a clear relationship between the two indices. Other studies of Roelen et al. (2010), (Roelen et al., 2012) found a mismatch between income and multidimensional poverty for children below 15 years of age in Vietnam.

Mahadevan and Hoang (2016) exploit data from Vietnam Household Living Standards Survey (VHLSS) in 2010 to examine the relationship between multidimensional deprivation and income poverty. In their study, the MPI is derived using the latent class categorization method based on 13 indicators. The empirical finding of a strong association between the two poverty measurements in Vietnam is contrary to previous literature that mostly limited to developed country cases such as

United States (Wagle, 2008, Iceland and Bauman, 2007, Short, 2005), Britain (Bradshaw and Finch, 2003) or Spain (Ayala et al., 2011, Labeaga et al., 2011). A practical policy implication from this finding is that the government of Vietnam has the possibility of addressing both income and multidimensional poverty without separate programs, which evidently save budget resources in terms of planning and funding. However, when comparing between the two groups of children and adult poverty, their different empirical results provide suggestion of individual policy sets are necessary in dealing with income and multidimensional poverty for each group (Mahadevan and Hoang, 2016).

In another study of similar vein, Mahadevan and Hoang (2015) investigate the link between poverty and food security/insecurity which was proxied by three selected instruments: (i) calorie intake (ii) subjective measure of food adequacy, and a (iii) composite index of the latent class model. The authors also examine the issue of persistent or transient poverty to provide deeper and more relevant policy implications in addressing food security in Vietnam. Their empirical results show obvious different impacts on food security between urban and rural areas. Whilst there was no link between poverty and the composite food security index in the urban area, a weak link exists in the rural region. However, with the first two instruments proxied for food security the link with poverty was robust regardless rural or urban regions. Regarding the nature of poverty, transient poverty status has negative impact on calorie intake in both rural and urban regions while persistent poverty does not affect urban calorie intake and reduces rural indicator. Subjective perception of food adequacy seems not associated with the income status of the past then none of poverty types (transient or persistent) has impact on this instrument for food security. With the third instrument, composite index of food security, transient poverty was found to affect the urban areas whilst persistent poverty did affect in rural areas.

3.4 VALUE CHAIN APPROACH AND APPLICATION IN AGRICULTURE

3.4.1 Value Chain analysis

Value chain analysis was first introduced by Porter (1985) with two key elements:

(1) The first is that value creation activities are performed in different connected stages (inbound logistics, operations, outbound logistics, marketing and sales, and after sales services), which are facilitated by supporting activities (strategic planning, human resource management, technology development, and procurement). Porter refers to these intra-firm linked activities as the value chain;

(2) The second is that value creation activities need not be performed within a single value chain but may be provided by other chains. The intra-firm link function has been developed with the concept of the multiple-linked value chain, which Porter refers to as the value system. This value system basically extends his idea of the value chain to inter-firm linkages.

The "value chain" concept has been widely used as a methodological tool to understand economic globalization and international trade dynamics. Depending on the main focus, the activity that is emphasized, or the way in which they have been applied, can also be referred to as 'production chains', 'marketing chains' 'supply chains' or 'distribution chains". Although it is impossible to make fine distinctions among these often overlapping concepts (Webber, 2007), some basic definitions have been formulated and used. Among those, the most widely known and accepted was developed by Kaplinsky and Morris (2001), who describe a value chain as *"the full range of activities required to bring a product or service from the conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers; to final disposal after use"*.

The value chain is divided into two types, the simple value chain or the extended value chain. In the simple value chain, there are ranges of activities within each link of the chain. A simple value chain implies the range of activities performed within a business organization to produce a certain output. This might include the

conception, design, and product development stage, the process of acquisition of input, the production, the marketing and distribution activities, consumption, and recycling. All of these activities form the value chain, which links producers to consumers, and each activity adds value to the final product.

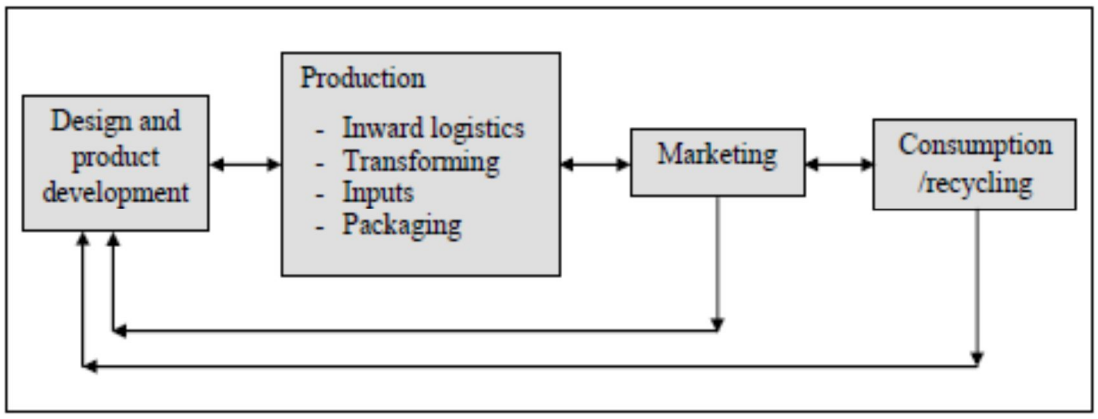

Figure 3-1: Four links in a simple value chain

Source: Kaplinsky and Morris (2001)

The extended value chain is more complex compare with simple ones. Its range of activities are implemented by various factors. This chain begins from raw materials production and to be linked with other factors involved in assembling, trading, processing, exporting, recycling, etc. It does not look at the activities implemented by a business organization. However, it includes all the backward and forward linkages, until it reaches the level at which the raw material production is to be linked to the final consumers (M4P, 2008). In this study, the value chain approach is further developed to enable understanding of how farmers can vary internal mixes to adjust to external changes.

Issues of organization and coordination, the strategies, as well as the power relationships of the different actors in the chain, are important. The scale of a value chain might be local, regional, national, or global. Value chain analysis therefore requires investigation of developing shared information, and how the relationships between actors are established and evolving (Doan, 2011). This is closely related to the concept of governance in value chain.

3.4.2 Governance in Value Chains

The concept of 'governance' is central to the global value chain approach. Humphrey and Schmitz (2001) examined the interaction of global value chain

governance and cluster governance as related to researchers and policies makers. They used the term to express that some firms in the chain set and/or enforce the parameters under which others in the chain operate. The two authors distinguished between different kinds of chains and elaborate on the way they arise. At any point in the chain, the production process (in its widest sense, including quality, logistics, design, etc.) is defined by a set of parameters that specify what product, how, when, and how much is to be produced (Humphrey and Schmitz, 2001, Humphrey and Schmitz, 2000).

There are two types of governance in a value chain: (1) buyer-driven commodity chains: those cases in which the coordination is undertaken by buyers; and (2) producer-driven commodity chains: those in which producers play the key role in chain (Gereffi, 1999).

> "*Producer-driven commodity chains* are those in which large, usually transnational, manufacturers play the central roles in coordinating production networks (including their backward and forward linkages). This is characteristic of capital- and technology-intensive industries such as automobiles, aircraft, computers, semiconductors and heavy machinery…. *Buyer-driven commodity chains* refer to those industries in which large retailers, branded marketers, and branded manufacturers play the pivotal roles in setting up decentralized production networks in a variety of exporting countries. This pattern of trade-led industrialization has become common in labour-intensive, consumer goods industries such as garments, footwear, toys, housewares, consumer electronics, and a variety of handicrafts. Production is generally carried out by tiered networks of contractors that make finished goods to the specifications of foreign buyers"(Gereffi, 1999).

Gereffi et al. (2005) further extended this to the following five basic types of value chain governance, which range from high to low levels of explicit coordination and power asymmetry:

1) ***Markets:*** market linkages do not have to be completely transitory, as is typical of spot markets; they can persist over time, with repeat transactions. The essential point is that the costs of switching to new partners are low for both parties.

2) ***Modular value chains:*** typically, suppliers in modular value chains make products to a customer's specifications, which may be more or less

detailed. However, when providing 'turn-key services' suppliers take full responsibility for competencies surrounding process technology, use generic machinery that limits transaction-specific investments, and make capital outlays for components and materials on behalf of customers.

3) ***Relational value chains:*** In these networks complex interactions between buyers and sellers can be seen, which often create mutual dependence and high levels of asset specificity. This may be managed through reputation, or family and ethnic ties. Many authors have highlighted the role of spatial proximity in supporting relational value chain linkages, but trust and reputation might well function in spatially dispersed networks where relationships are built-up over time or are based on dispersed family and social groups.

4) ***Captive value chains:*** in these networks, small suppliers are transactionally dependent on much larger buyers. Suppliers face significant switching costs and are, therefore, 'captive'. Such networks are frequently characterized by a high degree of monitoring and control by lead firms.

5) ***Hierarchy:*** this governance form is characterized by vertical integration. The dominant form is managerial control, flowing from managers to subordinates or from headquarters to subsidiaries and affiliates.

Basing on this typology, Gereffi et al. (2005)'s theory of global value chain governance indicates that governance structure is not static, rather it can evolve over time, subject to changes of determinants. There are three key determinants that identify conditions under which the type of value chain governance arises accordingly:

(1) The *complexity* of transactions: information and knowledge transfer required to sustain a particular transaction, particularly with respect to product and process specifications

(2) The *ability to codify* transactions: the extent to which information and knowledge can be codified and, therefore, transmitted efficiently and without transaction-specific investment between the parties to the transaction; and

(3) The *capabilities* of actual and potential suppliers to meet the requirements of the transaction in the supply-base.

Table 3-1 lists the five global value chain governance types, along with the values of the three variables that determine them. Given the values (high or low) ascribing to the above determinants, Gereffi et al. (2005) identified which types of global value chain governance should be expected. Each governance type provides a different trade-off between the benefits and risks of outsourcing. The last column of Table 3-1 shows the spectrum of levels of explicit coordination and power asymmetry between buyers and suppliers accompanies with each governance types (from low in the case of markets to high in the case of hierarchy).

Value chain governance patterns are not static or strictly associated with particular industries. They depend on the details of how interactions between value chain actors are managed, and how technologies are applied to design, production and the governance of the value chain itself. Moreover, the value chain governance patterns are also monolithic. Even in a particular industry in a particular place and time, governance pattern may vary from one stage of the chain to another (Gereffi et al., 2005). The dynamism of the theory of global value chain governance opens up the possibility that by improving capability, for example, producers in captive chains can break the existing governance structure to gain a more favourable position in the chain.

Table 3-1: Key determinants of global value chain governance

Governance type	Complexity of transactions	Ability to codify transactions	Capabilities in the supply-base	Degree of explicit coordination and power asymmetry
Market	Low	High	High	Low
Modular	High	High	High	↕
Relational	High	Low	High	
Captive	High	High	Low	
Hierarchy	High	Low	Low	High

Source: Gereffi et al. (2005).

3.4.3 Distribution of economic returns and price pass-through along value chain

How economic returns are distributed among actors of the value chain is one of the concerns of global value chain analysis. The notion of economic return in the value chain is in line with the notion of value appropriation, raised by Mizik and Jacobson (2003). They both point out what a firm gains from buyers, for the value it provides the buyers.

There are various terminologies used to indicate economic return in the global value chain literature. For instance, Gereffi (1994) uses the term 'wealth', Kaplinsky (1998) uses 'economic rent', and Schmitz (2006) applies 'gain'. Adapting and extending the typologies of rent in (Kaplinsky, 1998), Gereffi (1999) theorized that:

> "*Producer-driven chains* rely primarily on technology rents, which arise from asymmetrical access to key product and process technologies; and organizational rents, which refer to a form of intra-organizational process know-how that originated in Japan, and is particularly significant in the transition from mass production to mass customization (or flexible production), involving a cluster of new organizational techniques such as just-in-time production, total quality control, modular production, preventive maintenance, and continuous improvement. *Buyer-driven chains* are most closely tied to relational rents, which refer to several families of inter-firm relationships, including the techniques of supply-chain management that link large assemblers with small- and medium-size enterprises, the construction of strategic alliances, and small firms clustering together in a particular locality and manifesting elements of collective efficiency associated with OEM production; trade policy rents, understood as the scarcity value created by protectionist trade policies like quotas; and brand name rents, which refer to the returns from the product differentiation techniques used to establish brand-name prominence in major world markets."

Empirical studies on the distribution of gains along a coffee chain by (Fitter and Kaplinsky, 2001)) and (Kaplinsky and Fitter, 2004), indicate inequality in the distribution of gains between less developed and developing country producers and the global value chain leaders. (Kaplinsky, 2005) indicated a decline in the terms of trade for developing countries' manufactured exports. Summarizing key findings from the empirical studies of coffee (Fitter and Kaplinsky, 2001, Kaplinsky and Fitter, 2004) and the shoe sector (Bazan and Navas-Alemán, 2003, Bazan and Navas-Alemán, 2004), on the gains along the chain, (Schmitz, 2006) concluded that there

was little information as to the critical question of whether other nodes of the value chain (such as logistics, design, and marketing) offered higher returns than manufacturing.

The price pass-through effect in this research is an application and derived from the concept of exchange rate pass-through in international trade theories which is defined as the percentage change of local currency import prices due to a 1% change in exchange rate between exporting and importing countries (Yuqing, 2010). It will be considered in the aspect of how export price variation is transferred to farm-gate or producer price in value chain analysis of Vietnam's rice sector. If the farm-gate price respond to export price variation one for one, the pass-through is complete. Constant marginal costs and constant mark-ups of prices over the cost are required conditions to warrant complete pass-through (Goldberg and Knetter, 1997). However, there is no empirical evidence to support a complete pass-through hypo dissertation (Yuqing, 2010).

Goldberg and Hellerstein (2008) pointed out that general patterns regarding pass-through effects mostly emerge from empirical studies. They stressed on the important role of non-traded costs or imported inputs which were estimated to contribute 50% to 78% to incomplete pass-through. These estimates are in line with findings from (Goldberg and Campa, 2006, Burstein et al., 2003). Traded costs and nontraded costs are distinguished base on the currency in which these costs are paid (Hellerstein, 2008). According to this distinction traded costs, by definition, incurred by the seller in her home country. As such, they are subject to shocks caused by variation in the nominal exchange rate when they are expressed in the destination market currency. In contrast, nontraded costs are defined as those costs not affected by exchange-rate changes.

Casaburi and Reed (2013) develop a model of interlinked transactions to examine the multiple margins through which value is passed from traders to agricultural producers. Their case study is focus on Sierra Leone cocoa industry where transactions in which buyers provide credit or other services to producers in addition to buying output are common. In the presence of such interlinked transactions, their empirical results show limited price pass-through in response to an increase in the trader resale price. The findings emphasize substantial effects off

these interlinked transactions on the pass-through rate from end buyer's price to producer's benefit.

3.5 CHAPTER SUMMARY

In summary, Chapter 3 has provided a comprehensive review of relevant literature streams focussing on the issue of the relationship between the trade liberalization process and welfare impacts. A large body of empirical studies have used economy-wide, multi-sectoral computable general equilibrium (CGE) simulations or the gravity model to analyse the welfare impacts of trade liberalization in terms of trade agreements at country- or sector-levels. Some other studies incorporated micro-databases to investigate effects at household levels. The chapter also reviewed the literature stream that focussed on trade-induced impacts on welfare via specific factors such as price changes. The review of the value chain approach which reflects the dynamism of governance patterns and distribution of returns, pass-through effect of price along the chain provides a conceptual background for the rice value chain analysis discussed in Chapter 5 as well as the policy implications set out in Chapter 7.

Chapter 4: Theoretical foundation of farm household welfare under trade liberalization impact

4.1. INTRODUCTION

The main purpose of this chapter is to develop a farm-household framework to represent rice-farm production in Vietnam and potential lines of impact of trade liberalization. This framework aims to develop established theoretical household model to include welfare impact possibilities associated with the three price influences (local, national and global settings) of trade liberalization. The chapter will consider how a rice farm household may respond given the context of market and government policies interactions. Differences occur with three-level price influences and farm household decisions are subject to circumstances. Analysis of the transmission channels of trade liberalization impacts shows ways that farm household welfare can be affected.

4.2. FRAMEWORK OF THE APPROACH

This study uses a mix of qualitative and quantitative methods to address the research questions proposed in Chapter 1. The advantage of this mixed method is that it combines the strengths of both quantitative and qualitative approaches. It uses multiple worldviews or paradigms rather than the typical association of a certain paradigm to qualitative and quantitative approaches (Greene, 2008, Johnson et al., 2007, Turner et al., 2008). From the combination of methods, complementary insights can also be gained.

4.2.1. Ex-ante and ex-post analyses

In general, analysis of the impact of trade liberalization in agriculture on household welfare can be divided into two broad approaches:

(1) *Ex-ante analysis*, measuring the impact of *proposed* trade liberalization measures using pre-liberalization data. Some typical *ex-ante* studies include Ravallion (1990) and Minot and Goletti (2000)

(2) *Ex-post analysis*, using data before and after trade reforms to estimate changes in household welfare (Isik-Dikmelik, 2006, Klytchnikova and Diop, 2006). Some *ex-post* studies include Finot et al. (2011), Isik-Dikmelik (2006), Klytchnikova and Diop (2006), Dercon (2006), Nicita (2004), and Porto (2003).

This study employs ex-post analysis using data from both pre- and post-liberalization periods to present a comparative analysis between pre- and post-liberalized scenarios of household welfare.

4.2.2. Current models in use

As discussed in Chapter 3, gravity models and computable general equilibrium (CGE) models are the most popular and widely used models to measure and predict *ex-ante* the welfare effect of trade liberalization in the literature of international trade. Both typically analyse the impact of trade reforms at the macro level using country-level data. The gravity model is generally used to assess economic welfare impacts from bilateral or regional trade agreements associated with the formation of free trade areas or customs unions. Gravity models often use an aggregate database at national and regional levels.

CGE models are preferred for measuring economic impacts from trade liberalization. However, CGE models are often criticized for being extremely complex and highly sensitive to the assumptions and model specifications. The focus is on sectors in which poor people may have little involvement or may be represented using a concept of a single 'representative' household (Turner et al., 2008). CGE parameters and functions may be difficult to estimate, and typically have an inability to support disaggregate analysis or may employ questionable parameters values (Panagariya and Duttagupta, 2001, Schiff and Winters, 2003, Narayanan et al., 2010).

Many studies have applied multiple methods and multiple estimation techniques to overcome shortcomings associated with a single model for measuring the impact of trade liberalization on household welfare. Recent studies by Talukder (2011), Akapaiboon (2010), Urassa (2010), Kazungu (2009), Teweldemedhin (2009), and Bhattacharyya (2006) have applied multiple methods and techniques to achieve the answers to designed research questions. This study uses both qualitative and quantitative methods to address the research questions proposed in Chapter 1. The

advantage of this mixed method is that it combines the strengths of both quantitative and qualitative approaches and uses multiple worldviews or paradigms rather than the typical association of a certain paradigm to qualitative and quantitative approaches (Greene, 2008, Johnson et al., 2007, Turner et al., 2008). Moreover, from the combination of methods, complementary insights can also be gained.

4.2.3. Welfare concept and its measurement

This dissertation examines the impacts of trade liberalization on the welfare of farm households in Vietnam. Impacts are measured through changes in productivity, price changes, and employment changes over years as a result of the trade liberalization process.

In general, welfare is a term that may include various components, material and non-material. However, a complete description of all components is neither desirable nor possible (McKenzie and Pearce, 1982). The term 'welfare' in this study is defined as the meaning conveyed by the concepts 'satisfaction', 'well-being' and 'utility' which are widely used in economics and social science, and usually described by some system of social and economic indicators (Allardt, 1976, McKenzie and Pearce, 1982, Deaton and Zaidi, 2002, Strengmann-Kuhn, 2000).

The welfare level attained by the household varies depending on different bundles of goods and services they have consumed. However, due to the heterogeneity of households, the welfare function may differ across households and circumstances. This also implies that an identical bundle of goods may produce different levels of welfare across households. Therefore, the welfare function depends not only on the bundle of goods and services, but in many cases, also on various socio-economic characteristics of households such as age range, health status, employment, education level, etc. This study considers these factors in analysing farm-household welfare.

The two straightforward and useful measures of economic welfare, income and consumption, are considered as they capture the means by which households can achieve welfare (Strengmann-Kuhn, 2000, Wagle, 2007). These two indicators tend to correlate highly with each other, as consumption depends on income, and income is essential for consumption. The use of both measures can promise better results however, especially in developing countries where one can have consumption

without income – for example, through government transfers, charities, family friends, bartering, and home production not counted as income (Wagle, 2007). Nevertheless this study employs consumption as an empirical estimates of household welfare based on reasoning provided in the following chapters.

4.3. FARM-HOUSEHOLD PRODUCTION AND OPERATION UNDER TRADE LIBERALIZATION

4.3.1. Modelling the basic production complex (established)

In most developing countries, agriculture is a vital sector of the economy because it provides both consumption items and an essential source of income for a majority of the population. The sector is also an important earner of foreign exchange through agricultural exports, and a focal point for government policy. Efforts to predict the consequences of agricultural policies, however, are often confounded by the complex behavioural interaction characteristics of rural economies (Singh et al., 1986b). Most agricultural households produce for dual purposes, partly for sale and partly for own consumption. They also purchase some of their inputs, such as fertilizer and hired labour, and provide some inputs, such as family labour, from their own resources. Any change in the policies governing agricultural activities will therefore affect not only production, but also consumption and labour supply of the farm households.

According to Singh et al. (1986b), agricultural household models are built up to capture the interactions in a theoretically consistent fashion and in a manner that allows empirical applications, so that the consequences of policy intervention can be illuminated. Such models enable the analyst to examine the consequences of policy in three dimensions:

First, at household level, the models are used to analyse policy impacts on the well-being of representative agricultural households. In the models, well-being is often represented by household income, expenditure (or mean of such values), or some other measures such as nutritional status.

Second, at sectoral level, an understanding of the behaviour of agricultural households would shed light on the spill-over effects of government policies on other segments of the rural population.

Third, at more macroeconomic perspective, the models may help governments investigate the performance of the agricultural sector as an important source of revenue for the public budget or a significant contributor of foreign exchange.

Singh et al. (1986b) argued that in order to assess the effects of a pricing policy on the budget or the balance of payments the government has to consider how agricultural households adapt their production and consumption in response to changes in prices. A reduction in export taxes, for example, may increase earnings of foreign exchange and budget revenue if households market enough additional production. As agricultural household models capture both consumption and production behaviour, they are an appropriate tools for examining the effect of a pricing policy on marketed surplus, and hence on foreign exchange earnings and budget revenue (Singh et al., 1986b).

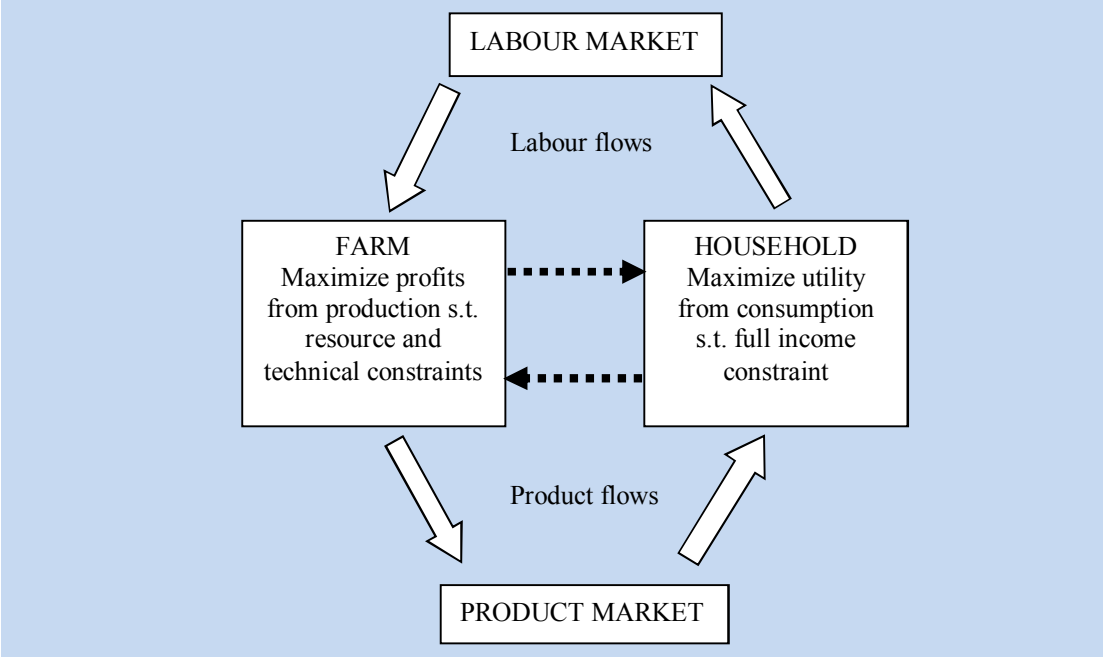

Figure 4-1: Structure of farm-households

Since the early theoretical contributions of Becker (1965) and Nakajima (1969), the farm-household has become a popular focus of attention for economists. Empirical application of farm-household economics theory is now widely used, following the lead of Barnum and Squire (1979) and the comprehensive volume edited by Singh et al. (1986a). Most applications are based on a simple conceptual model such as that illustrated in Figure 4-1, which is adapted from Delforce (1994).

The figure shows two linked stages. First, the model farm-household acts as if it seeks to maximize profits from its production activities, subject to production function constraints. Second, the resulting revenue then forms part of its full income constraint, subject to which the household is assumed to maximize its utility from consumption. This structure is based on a perfect markets assumption and the household model is considered a separable model.

Theoretically, agricultural farm-households have been categorized into three main groups. The first is the group of *pure-subsistence* farms using only family labour and producing no marketed surplus. The second type is the group of *wholly-commercial* farms that employ only hired labour, buy inputs, and market all output. In reality, the major part of world agriculture is located intermediately on a continuum between the two above mentioned farm types and constitute the third group of farm-households (Barnum and Squire, 1979). *Semi-commercial*[27] (or *semi-subsistence*) farm-households are the farm-households that retains part of their agricultural production output for their own-consumption and market the remainder.

Depending on the national development level, demographic and natural characteristics, the proportion of these three types of farm-household may vary across countries and regions. The welfare impact of trade liberalization, therefore, also varies, and the simplification of the farm-household model in Figure 4-1 may not be applicable in cases and contexts where a mixed community of farm households exists. This study focuses primarily on the semi-commercial farm households of the Vietnamese rice sector. They rely upon a mix of own production and external income.

4.3.2. Arrangements within the farm business entity

While an analysis of commercial relationships between price change and quantity supplied or demanded in agriculture may help to explain the impacts of trade liberalization and market openness on farmers' welfare at one level, the impacts are more complex when some production is consumed on or near farm. The preference in this dissertation is to assume that impacts can be variously distributed

[27] This terminology was suggested by NAKAJIMA, C. 1969. Subsistence and commercial family farms: some theoretical models of subjective equilibrium. *In:* CLIFTON R. WHARTON, J. (ed.) *Subsistence agriculture and economic development.* Chicago: Transaction Publisher.

across many stakeholders in Vietnam externally, interacting through various supply chain arrangements. In agriculture, farm establishments, enterprises, families, and holdings may all be impacted in a variety of ways.

A farm entity is seen to be composed of four main internal units, as illustrated in Figure 4-2:

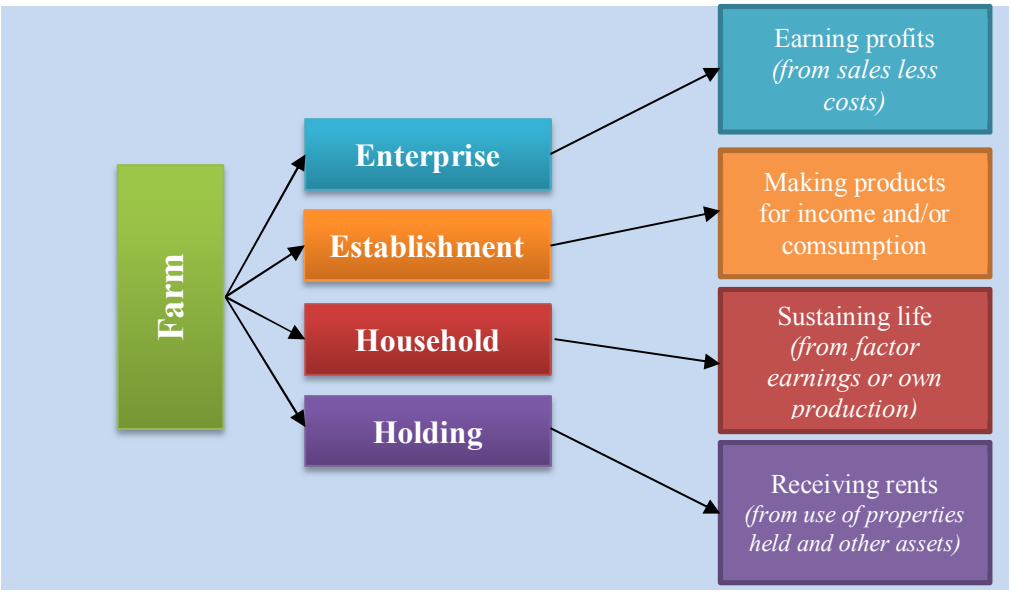

Figure 4-2: A farm entity with internal units

(i) Enterprises – the business unit;

(ii) Establishment – the physical unit;

(iii) Household – the resident unit; and

(iv) Holding – the ownership and control of the physical unit.

Each unit ideally has some distinct focal activity (as shown on the right of the figure). Accordingly, each unit will have also its own external exposures and balances will need to be struck between and within units. A single semi-commercial farm would include some mix of all four units within a web of relationships.

4.3.3. Farm household's decision possibilities

The farm-household as a decision maker can be assumed to have: (1) one simple choice set; or (2) a complex of choice possibilities. However, in order to understand the impacts (including welfare effects) this needs to be examined more closely. In the standard case, when the farm is *wholly-commercial* and has only one choice to link all of its input and output channels with markets, the farm's productivity, as well as the farmer's welfare, would follow the formal signal of

market prices (Figure 4-3). When prices change, both input costs and output sales returns are impacted. This case is considered a standard assumption in both aggregated and disaggregated analyses on farm-household welfare. The farm's productivity, efficiency, and profitability will certainly be affected, partly or wholly, by market price fluctuation.

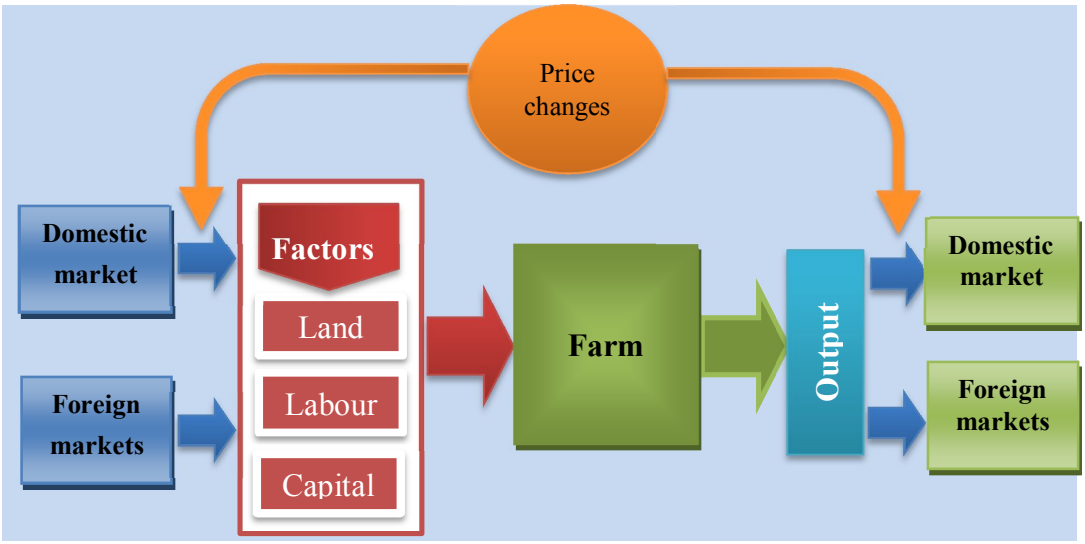

Figure 4-3: Farm-household with only one choice

However, links with markets are not necessary needed when farm-households are in *pure-subsistence*. *Semi-commercial* (or *semi-subsistence*) positions involve a mix. Such farms utilize multiple channels of both self-sufficient resources (such as family labour, capital) as well as accesses to markets (the links with domestic/foreign markets in Figure 4-3). The farms may store all or some needed input factors for future use, hedging the impact of market price volatility. For example, when market conditions are favourable such as when fertilizer prices decrease, farmers may decide to keep a certain quantity in stock for the next crops. On the other hand, they may also temporarily keep in stock all or part of their production output when prices are unfavourable. Impacts of price fluctuation on farm-household welfare, therefore, will be moderated accordingly.

4.3.4. Farm-household as a node with multiple links

Farm-households' welfare can then be analysed from two different economic angles. Firstly, a farm-household is a factor and manager of agricultural production. Secondly, each farm-household is also a final-consumer who seeks inputs for the family's living needs. Each farm-household accesses a supply of production factors

(classically land, labour, and capital) and intermediate products from sources both within and/or outside the farm-household.

As a producer, a farm-household that supplies markets with production outputs receives revenue from sales that provide entity earnings and then income to the farm-household. However, part of farm production output may also serve farmer or family needs directly. Farm-households providing for more than the immediate physical needs of a farmer's family can sell or barter their surplus products. While subsistence farm-households have no such surplus product, some other farms may have no immediately usable products (as with industrial crops or when further processing is needed). Such situations can affect farm household's responses to changing external conditions.

The schema in Figure 4-4 sets the farm-household entity within three sources of 'environmental' influence on farm-household activity:

(1) from market via price changes;

(2) from society via customs, interpersonal obligations, traditional formalities and similar traits;

(3) government's intervention through policies and regulations.

The figure displays four levels of input and output linkage, which can be termed Styles 1 to 4. The farm links with input and output sources by formal links (Styles 3 and 4, to domestic (3) and foreign (4) markets) and informal links (Styles 1 and 2, to on farm (1) and near farm (2) sources). Formal and informal links are termed according to whether contacts and money are dominated or not. Links to the three environmental influences are direct or indirect to the flows of input and output. The farm is then at the centre of a web of influences and occupies contested terrain (multiple competing and/or complementary influences) with the farm decision maker having to balance these sources. Standard economics primarily focuses on Styles 3 and 4 formal links and direct channels for environmental influences with no (or just a constant background of) societal influence. This model can be expected to work when such assumptions are reasonable, as in high formalized and narrow interactions.

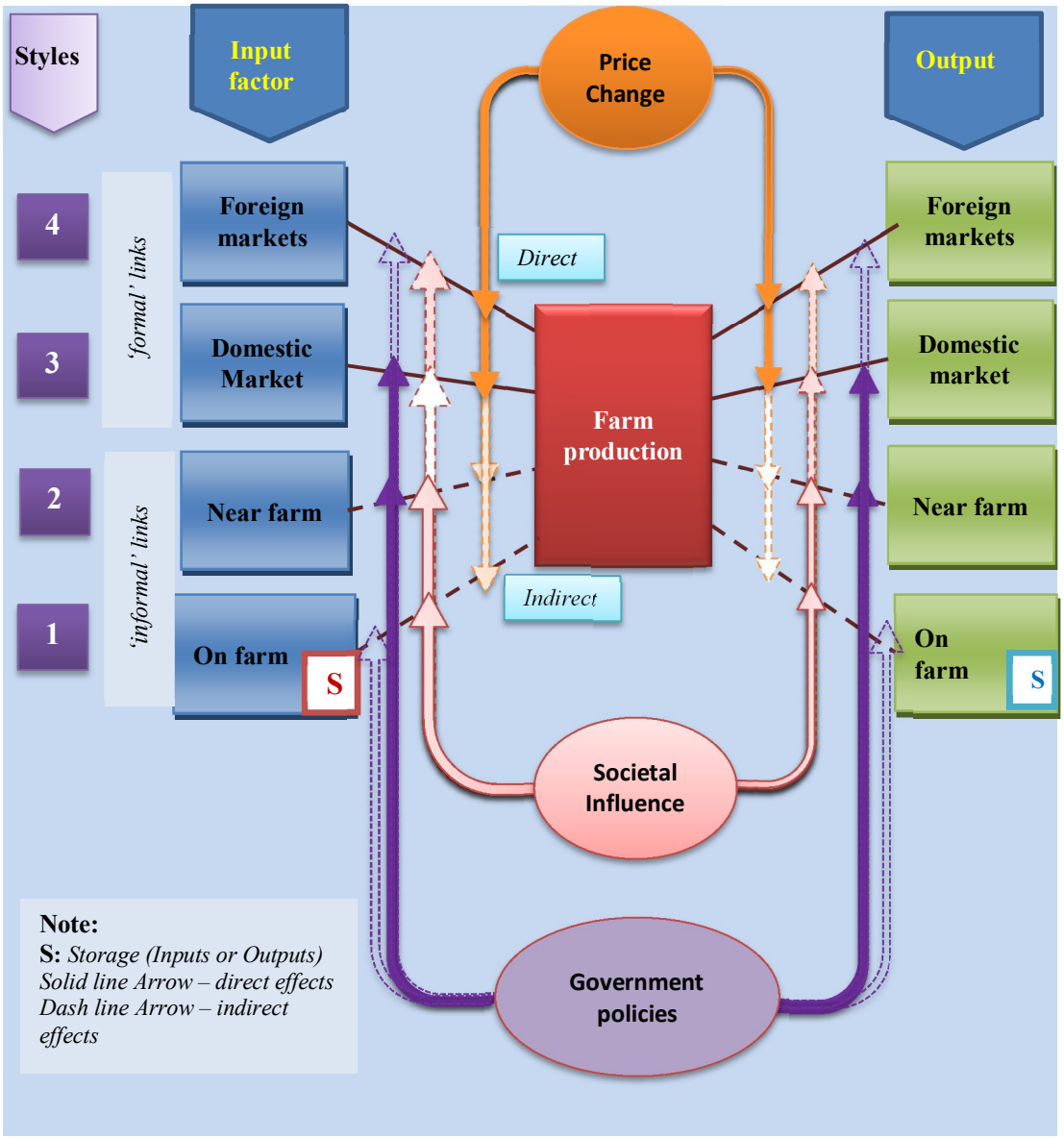

Figure 4-4: Farm-household with alternative choices

Styles 1 and 2 plus "society" are more in traditional informal societies, where a government seeks to directly control via people all types of on and near farm activities. Vietnam currently hosts a mix of environmental influences and welfare impacts. It is not only farm relationships that can be styled differently. Some regions (for example, the Mekong River Delta) are increasingly Styles 3 and 4 (commercial and formal), where other regions are more closely held (Styles 1 and 2, semi-commercial and informal) with local public officials interpreting.

Aside from market (via price regime) and societal influences, government policies play a significant role in intervention into farm-household's activities. In the schema (Figure 4-4), government regulations and policies are supposed to have a

direct influence on the domestic market and near farm links with farm production, and have an indirect influence to the other two links, foreign market and on farm activities. However, these links are conditioned by the agents and agencies involved.

In broad terms, governments can help farmers earn more income than the market would otherwise provide them by either: (a) imposing tariffs/granting export subsidies that drive up the prices consumers pay producers in the domestic market, or import subsidies for productive inputs that give support to producers; or (b) supplementing markets receipts with payments drawn directly from budgetary funds (OECD, 2003). With a perfect transferring mechanism (which exists only in theory) the extra money consumers pay through higher prices or that tax-payers pay to budgetary funds would find its way directly into the income of intended beneficiaries, farm households.

In reality, however, the major share of that money often ends up in pockets of other stakeholders. Farm households can only get part of the support meant to compensate the factors of production. This is typically a rather small share of the total. Farmers may buy most farm inputs from outside the farm, and as a result, input suppliers capture some, usually a significant, share of the benefits of support. Similarly, if farmers rent rather than own the land, some of the benefits of support will accrue to the landowners. Moreover, a significant proportion of what consumers and taxpayers pay to support farmers disappears in "resource costs", the resource allocation distortions caused by the support.

The development of schema in this section aligns with the theoretical discussion of value chain governance in section 3.4 of Chapter 3. Each style of farmer household categorised here can be adapted to the distinctive the value chain governance theorized by Gereffi et al. (2005). For example, for farm households whose production process links closely with foreign markets, it can be assumed that value chain governance of markets will arise. Relational governance structures may fit with farm households of style 2. Style 1 can be seen as principally an internal value chain.

4.3.5. Schema development: two-stage farm production cycles

The schema is extended as shown in Figure 4-5 to analyse welfare impacts of economic openness on farm households as an entity.

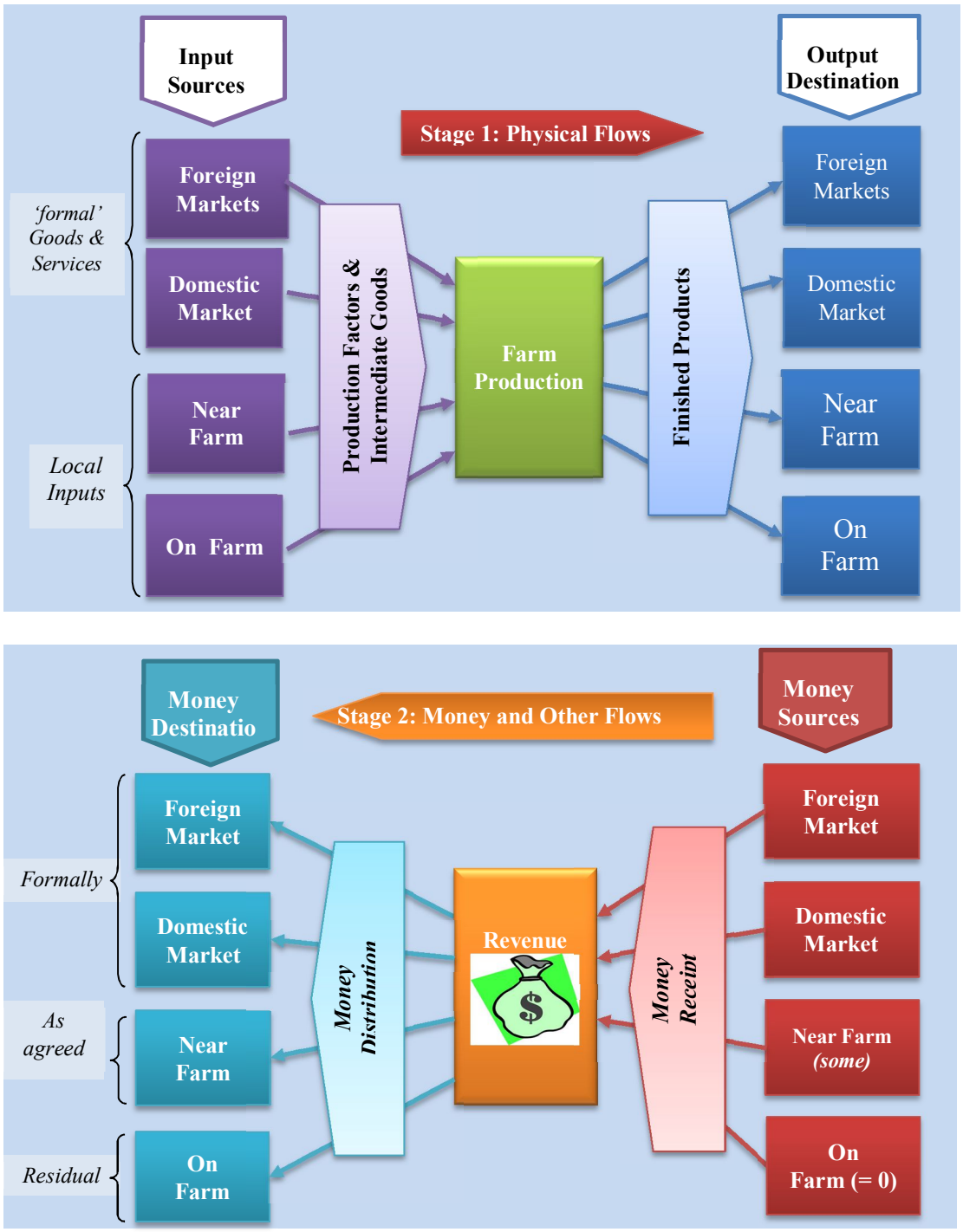

Figure 4-5: A Two-stage Farm Production Cycle

The schema illustrates a simple 2-stage farming cycle in terms of physical flow (termed Stage 1), money and other benefits flow (Stage 2). The flow of money and

other benefits (i.e. payments not in terms of money) follow physical flows with the farm entity at the centre of the cycle. Production inputs are also acquired by farm household from near-by or "in-place" locales, as well as "on-farm" sources, with the remaining proportion bought from markets. Farmers (or farm household) then response to influences that stem from these three "levels" of market, local, and on-farm sources or sinks (destinations). Following liberalization, external (to the nation) influences are now potentially directly important across any links between sources and destinations. A farm household in Vietnam may currently have to deal with stresses associated with foreign, domestic, near farm and on farm shocks.

- ***External shocks*** involve any (market, policy, or other) changes occurring outside the national border. Examples would include trading partner policies, crises, and world price volatility of a specific commodity.
- ***Domestic policy changes*** (such as tariffs, domestic taxes, exchange rates, subsidies, or financial support), inter-sectoral stresses, and changed macroeconomic conditions impose domestic shocks, as they are associated with stresses from within, or as interpreted at, national borders.
- ***Near farm*** is a catch-all for various influences that are regionally or locationally based. Varying products and factors may be locally available and personal, kin, or cultural influences can condition the terms of transactions.
- ***On farm*** includes the activity mix occurring within the boundaries of the farm. Adjustment may involve changes to this mix, with impacts somehow distributed by the farmer "in consultation" with family members or other stakeholders. All manner of arrangements to reduce strains may be used, and few of these need be recorded.

Unlike the first two cases, the means of shock (and response) transmission typically extends beyond formalized transactions in 'near' and 'on farm' shocks. The first two are often at 'arm's length' and objectified, the latter two 'face to face' or personalized.

Such farms may then adjust to stresses in different ways within a dynamic response process. They need not respond "as modelled" or otherwise expected. While patterns may emerge from aggregates of "like" farm properties, regional and district impacts may vary significantly from the average of an aggregate. This

appears particularly likely under conditions of strained welfare, particularly when it is seen as deteriorating for some or all parties. Illustratively, a prosperous farm may house persons usually "surplus to farm needs" and effectively subsidize their living cost. As conditions tighten, such persons may (be forced to) leave to join "displaced farm workers", who may or may not find sufficient employment elsewhere.

The framework of the two-stage farm production cycle represents three typical patterns of Vietnam's rice farm household production in different regions:

(1) *Price driven interaction pattern:* farm households' production has close linkages and interacts with both the input market and output market, which involves different actors along the value chain. Most are market-oriented farms that receive and respond to the price signal of the market to make decisions about production. In Vietnam, most rice households following this production pattern are in the MRD and some rice surplus provinces of the RRD region. These market-oriented farms are the most affected group under the impact of trade liberalization, which is transmitted via price, employment, and fiscal channels as mentioned in the previous section of this dissertation.

(2) *Direct factor interactions pattern:* refers to farms where both input and output flows mostly interact with the near farm environment (such as within the village, commune, or nearby neighbourhood). They are locally oriented farms for which trade liberalization impact may have little effect on the production decision-making process. Transactions of input and output with nearby locations (commune or village) are by physical output products (for example, hired labour can be paid by paddy output when the crop is harvested).

(3) *Pure subsistence interaction pattern:* refers to farm-households with small holdings, a traditional method of rice cultivation or in remote areas with unfavourable conditions for growing rice. They are often family-oriented patterns, which have little or no rice surplus and mostly focus on meeting the family demand for rice. Trade liberalization has no (first-round effect) or little impact (second-round effect) on this group of farms.

The framework of farm production applied to rice production in Vietnam also provides insights into how rice farm-households may respond to external shocks (resulting from trade liberalization or like events). For rice farmers, each pattern of

production involves a different mix of cost, risk, and returns (both expected and realized) under a trade liberalization impact. A farm-household might therefore respond to external shocks by choosing the pattern that helps them achieve 'safe' returns following a risk-averse strategy designed to avoid serious adverse outcomes. In favourable conditions, with sufficient and suitable resources (land, labour, and capital), rice farm-households can choose to specialize in the market-oriented pattern of production to gain higher returns brought through openness and expansion of their output on the international market. However, in adverse conditions, or with insufficient comparative advantages over external threats, farm-households might choose the option of the second or third pattern of production as a safety measure and give priority to self-sufficiency or meeting family demand. At the national level, production patterns might vary across regions, implying that a regional differentiation in rice policy is necessary.

4.3.6. Risk associated with different styles of farm households

Risk in agriculture is pervasive and complex, especially in production (Hardaker et al., 2004). Farm households are frequently exposed to the various uncertainties such as weather, prices, technology, and crop diseases. Many of the factors that affect the farm household's decisions cannot be predicted with accuracy: weather conditions change, prices at the time of harvest could drop, hired labour may not be available at peak times, machinery equipment could break down when most needed, and government policy can change unfavourably in a season. All of these changes are examples of the risks that farmers confront in managing their farm as a business. They affect the farm's profitability. Moreover, farming has become increasingly risky as farmers become more commercial in an environment of market liberalization and increasing formal linkages. Smallholder farmers have especially become more vulnerable (Kahan, 2008).

The sources of risk and level of severity can vary depending on the farming systems, geographic location, weather conditions, supporting government policies, and farm types (Aditto et al., 2012). In developing countries, inadequate and imperfect information may be a reason to explain why risk become farmers' main concern. Farmers often lack of information about factors that impact their farming activities such as input prices, market price for their products, weather conditions, and government policies. Inadequate information also prevents farmers from doing

forecasts or having proper responses to condition changes to avoid or minimize risk. Regarding the policy aspect, incorporating and understanding the effects of risk at the farm level benefits policy makers who can develop appropriate strategies to help farmers survive the numerous risks they confront.

Aditto et al. (2012) and Kahan (2008) generally classified risks that associated with rice farm households into following five areas:

(i) *Production and technical risk:* includes weather conditions (rainfall, flood, or drought), pests and disease, breakdown or unavailability of equipment, and spare parts.

(ii) *Marketing risk:* refers to changes in prices (both for inputs and outputs) beyond the control of any individual farmer or farm household.

(iii) *Financial risk*: which is normally inherent in borrowing loans from banks or other official/or non-official financial institutions or entities to finance the farm business or farm production activities. This risk can be caused by uncertainty about future interest rates, a lender's willingness and ability to continue to provide funds when needed, and the ability of farmers to generate the income necessary for loan repayment.

(iv) *Institutional, policy, and legal risk:* refers to unpredictable changes in the provision of services from institutions that support farming activities. Such institutions can be both formal and informal and include banks, cooperatives, marketing organizations, input dealers, and government extension services. Part of institutional risk is the uncertainty of government policy affecting farming, such as price support and subsidies. The risks that farmers are facing are often a result of decisions taken by policy-makers and managers. Subsidies, quality regulations for export crops, rules that relate to the level of price, or income support payments are examples that can have a major impact on farm activities.

(v) *Human and personal risk:* refers to the risks to farm households caused by health conditions and the availability of labour supply of farm households. Accidents and illness can disrupt farm household's performance. Migration away from rural areas can cause labour shortages for the farming activities.

Mixes of the five risks exist on most farms and are frequently interrelated. The ability to repay debts depends on levels of production and the prices received for produce sold. Financing of production depends on the ability to invest or borrow capital and the ability of the lender to supply capital in time. The different types of risk often need to be considered together regarding each style of farms and the production pattern of rice households as outlined in previous paragraphs.

4.4 TRADE LIBERALIZATION AND TRANSMISSION TO FARMER WELFARE

4.4.1 Transmission channels

The influences of trade liberalization on household welfare and poverty have been one of the main recent focusses of development economics. There is wide consensus among economists that in the long-run free trade generates aggregate welfare gains through positive impacts on economic growth and poverty. However, empirical literature on the relationship is, for the most part, subject to criticism over methodology or data (Rodriguez and Rodrik, 2001). Recent studies indicate that the relationship between trade liberalization and welfare and poverty is largely case- and country-specific (Cho and Diaz, 2011, Minot and Dewina, 2010, Niimi et al., 2004, Bhagwati and Srinivasan, 2002).

In his seminal work, Winters (2002a) proposed three transmission channels by which trade liberalization involves households' welfare: the price channel, employment channel, and a fiscal channel. These three channels link with three broad groups of institutions: distribution channel arrangements, factor markets, and the government, respectively. The Winters' framework has been widely applied by various studies to investigate the relationship. For the purpose of this dissertation, the transmission mechanism of trade liberalization is adapted from Winters' framework as in Figure 4-6 next page.

External shocks generated by trade liberalization can be differentiated in a variety of different ways. First, trade liberalization has impacts on prices. Principally, a lifting or reduction of trade barriers (tariff and non-tariff) will lead to a decrease of the imports' price and an increase of exports' price. The extent to which households in fact experience these effects depends on the channel by which prices are transmitted between the border and the households (in the Figure 4-6 are links from

"Border prices" to "Household welfare"). The quality of infrastructure, geographical factors, the number of intermediary actors, and the reaction of domestic market can result in large differences in prices between different parts of the country (Hertel, 2006). For agricultural households, price variation changes the income generated by the crops produced, and the cost of production inputs as well as household consumption. Changes in this relationship can either increase or alleviate financial poverty. Therefore, households may need to adapt and adjust to price variation by changing the type or volume of crops produced or by changing consumption patterns. To this aspect, the level of education of household's adult members and their access to relevant information are essential in determining the household's capability to successfully make such adaptations. In general, the households not only respond to actual price changes but also to perceptions about future price variation, basing n their knowledge about the policies affecting them.

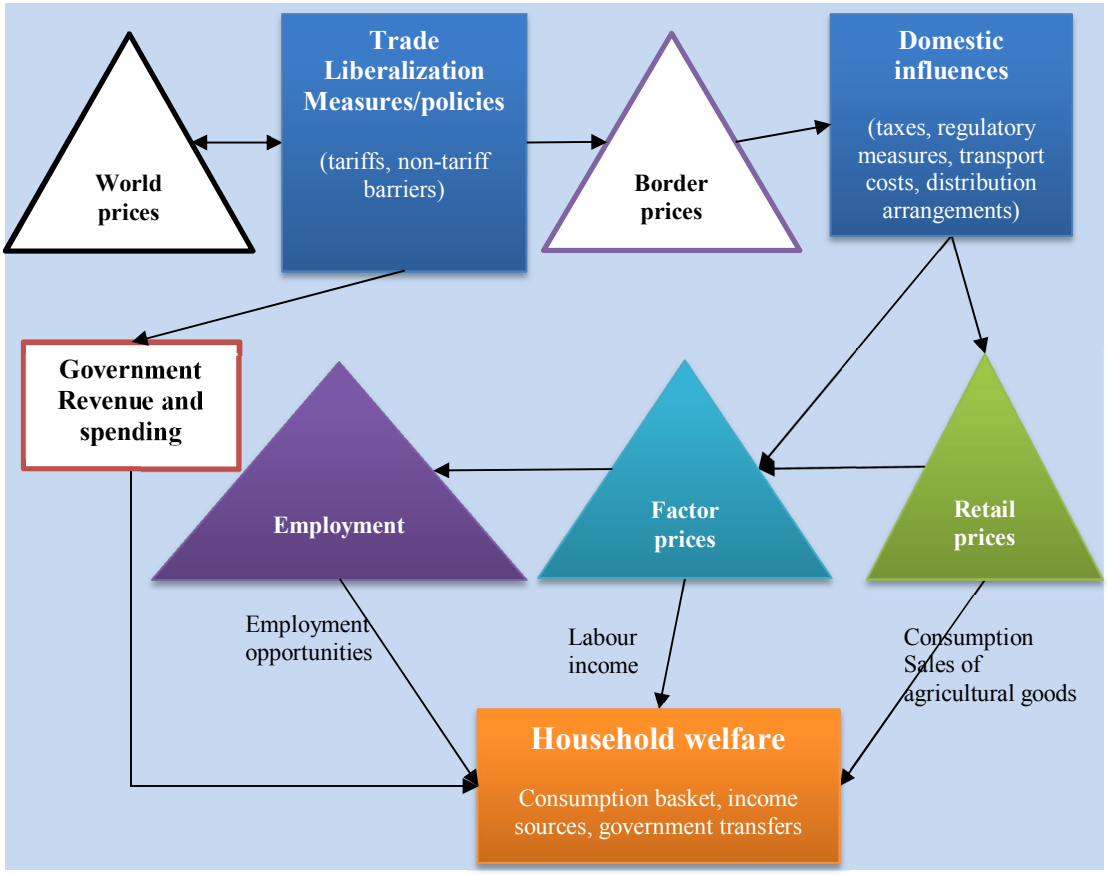

Figure 4-6: The Transmission of trade liberalization to farm household welfare

Source: (UNCTAD and WTO, 2012) and adapted from (Winters, 2002a)

The second impact of trade liberalization relates to changes in employment opportunity. Winters et al. (2004) assert that trade openness often leads to the creation of new product and/or labour markets and/or the disappearance of former markets. A farm household's ability to respond to such changes will typically depend on their capability to switch production or to make production more efficient in a market that has become more competitive. However, switching farm production or changing crop types often requires knowledge about which crops are profitable and how to produce new crop types. Changing crops may also create changes in the need for labour, and may therefore depend on a household's ability to provide this labour. Improving efficiency may require a combination of different knowledge and resources. Such changes will typically require some investment. This may be quite large, for instance when switching from agriculture to aquaculture. In some areas, land may only be suitable for a small variety of crops; therefore geographical location will also affect the ability to change production, as will the knowledge and networks to sell the products effectively (Besemer, 2012).

Regarding the third channel of effect, through government revenue and expenditure, Winters (2002a) argued that changes in tax revenue as a result of changes in trade policy may affect household welfare through changes in government spending, and in particular through changes in anti-poverty programs. The revenue effect is often more difficult to quantify due to lack of available data on government transfers at the household level. Moreover, to the extent that changes in revenue are proportionally distributed to individuals, their impact on inequality may be negligible, and thus can be ignored. However, in the case where government transfer is targeted at anti-poverty programs, trade liberalization-driven changes in government revenues could have a substantial impact on these programs, and thus indirectly on welfare and inequality (UNCTAD and WTO, 2012).

Aside from the above-mentioned direct economic effects, trade liberalization is normally accompanied by many other changes that indirectly impact on agricultural production and farmers' welfare. For instance, foreign direct investment (FDI) often flows into a country following its increasing integration into the regional and global economy and carrying out trade liberalization. FDI capital is typically concentrated in manufacturing industries, creating a greater demand for rural off-farm labour (Reardon et al., 2007). These FDI projects may require agricultural land to be

transformed into industrial purpose areas and attract a part of farming labour force to take part in non-farm employments. However, it is not all the farming households can take the development of manufacturing sector as a result of FDI as their opportunities to improve their welfare. Typical reasons for an inability to gain access to rural non-farm employment might be a lack of education, distance from off-farm employment opportunities, or the lack of knowledge and social networks to determine and participate in rural non-farm employment opportunities (Reardon et al., 2007).

Each channel in Figure 4-6 may be equally important for the overall analysis of the impacts of trade liberalization. However, given the data constraints and the purpose of investigating those channels most likely to have impacts on rice farm-households, this study will concentrate analyses on the price (via distribution arrangement) and employment channels only. The price channel in this study is captured by using historic changes in rice prices and rice productivity. As for the employment effect of trade liberalization, the proportion of household members and number of commune people employed in key export-oriented sectors/industries are used to capture the employment channel.

4.4.2 Two round effects of trade liberalization on household welfare

The immediate impact of trade liberalization is through a change in price levels. Previous studies have shown that in a competitive market, trade liberalization will trigger exports and a rise in domestic prices to equalize with world prices. This benefits the net seller of rice, while net buyers of rice face higher prices. In a market that is not competitive, along with trade liberalization, imports flow in to pull down the high domestic prices to world levels, hence benefiting consumers. There are always both winners and losers in each country, and the net gains are difficult to predict or measure and are case dependent.

However, there is good empirical evidence that countries that are competitive stand to gain substantially from trade liberalization. Studies on rice export and import countries predicted beneficial effects on poverty from rice trade liberalization in both types of countries. For instance, Deaton (1989) observed that an increase in rice prices in Thailand would benefit all rural households. Using a spatial equilibrium multimarket model, Minot and Goletti (1998) predicted that the elimination of the

rice export quota in Vietnam would raise prices by 14 to 22% on average, and could be expected to reduce both the incidence and depth of poverty. While also investigating the Vietnam case, Seshan (2005) found that when the effects of opening the rice and fertilizer market were isolated, Vietnam's agricultural trade reforms did not contribute to a significant improvement in overall household welfare or decline in poverty. However, in aggregation, trade liberalization did generate gains for rural households, particularly the poor, at the expense of the urban. In another study on Sri Lanka, Seshan and Umali-Deininger (2007) found that lowering of import duties on staple food items (such as rice, wheat, potatoes, chilies, and onions) would benefit the vast majority of the Sri Lankan population who are net consumers of these commodities. Duty cuts, in fact, significantly raise real household income and help the poorest households move out of poverty. Regarding the impact of rising prices on welfare and poverty in food importing countries in Africa, similar results were found in many other studies including Ivanic and Martin (2008), Arndt et al. (2008), Wodon and Zaman (2008), Ulimwengu and Ramadan (2009), Ulimwengu et al. (2009), and Cudjoe et al. (2010).

While it can be argued that only net sellers in these exporting countries benefit, this is not necessarily true when significant second-round effects are taken into account. For instance, apart from the direct effect of trade liberalization on rice farmer welfare, there could also be a lagged effect operating through agricultural wages and employment (Gulati and Narayanan, 2003). This argument is supported by Stolper-Samuelson's (1941) theorem which related the increase in output price with wages. Higher rice prices in exporting countries could stimulate paddy production, which is in turn expected to increase demand for agricultural labour, then driving up wages or offering more well-paid employment. Therefore, while an increase in the rice price may adversely affect net buyers of food in the short run, agricultural labourers and small farmers who supplement their income from agricultural wage earnings could gain through wage and employment increases in exporting countries in the long run. This price-wage linkage was found to hold true for Thailand in a study of Warr (2001). He found that the consumption benefit of lower rice prices as a result of a proposed rice export tax was outweighed by a negative income effect of the driving down of wages for unskilled labour. Given that the rural poor often derive about 40% of their income from unskilled employment,

export liberalization would benefit net buyers as well (Gulati and Narayanan, 2003). A similar linkage between rice prices and wages is apparent in Bangladesh in study of Ravallion (1990).

Another second-round effect of changes in relative prices is on investment. As prices in the competitive market increase, terms of trade shift in favour of agriculture, thus spurring private investment, which in turn has a positive effect on growth. Gulati and Narayanan (2003) found this linkage was apparent in India, where changing terms of trade in favour of agriculture brought about growth in private investment to an extent to which it more than compensated for a decline in public investment.

In the long run, there are also strong linkages between the farm and non-farm sectors in most countries (Gulati and Narayanan, 2003). Delgado et al. (1998) found that in Asia, a one-dollar increase in agricultural income resulted in an additional 80 cents for non-agricultural income for local enterprises, whereas, for selected countries in Africa, it was estimated to be more than two dollars. Much of the multiplier effect was driven primarily by household consumption demand and production linkages, predominantly within the rural farm and non-farm economies (Hazell and Hojjati, 1995). Rice trade liberalization could then trigger increased rice production in some of the poorer-country exporters, helping to create more dynamic rural economies overall. As most poverty in these countries is in rural areas, often with a share as high as 75%, a more dynamic rural economy would make substantial contributions to poverty alleviation (Gulati and Narayanan, 2003).

4.4.3 Farm-household and response external environment

The external situation of a farm can be recast in terms of how changes in the operating environment (which result from trade liberalization) will impact on farming entities and the agricultural sector. To frame the answer for this question, additional flowcharts have been developed, as in Figure 4-7.

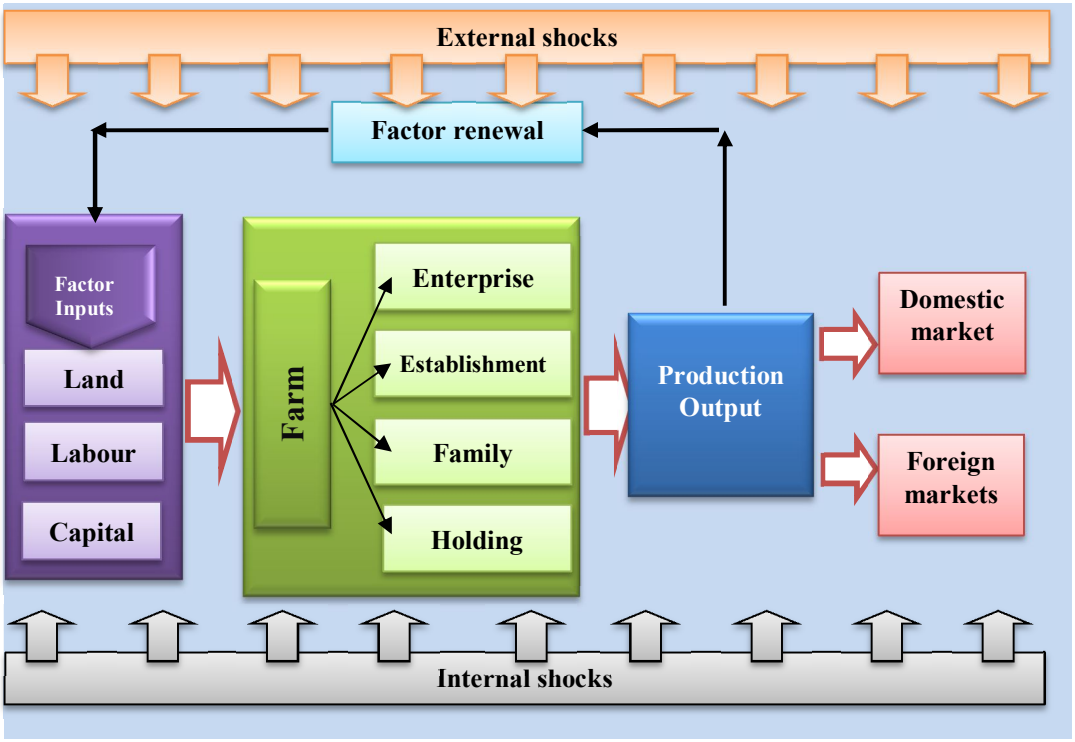

Figure 4-7: Farm's production cycle in a changing operating environment

One of the things expected from trade liberalization and gradual openness is that the process will decrease the incidence of one farm household doing everything. Activities tend to be broken up into specialized functions. Such a model of division of labour with specialization has considerable benefits, costs, and risks. The challenge then becomes how to strike a mix between delivering sustainable profits to the enterprise globally and to the various parts locally.

In case of Vietnam trade liberalization context with potential of agricultural exports, envisaged gains may raise the question of "Why should small farms be kept small rather than make farming more specialized and farms larger in size?" The current assumption that the small farm is inefficient or unsustainable is not necessarily true, especially under adverse risks and unfavourable conditions. The extent to which commitments have to be met when things are bad is an important issue. The practical result is that as a whole, semi-commercial farms can respond in number of ways to adverse conditions. Responses will feed back into the value chain. Illustratively, land, labour, and capital are used as factor inputs in making a farm's output. Part of a farm's output would be "held back" to sustain the production "process" and "factors". Another perspective needs to be considered in more specific

is about the institutional factors (e.g. government's food security policy mentioned in Chapter 2) which obviously also affect to farm-household's operation.

An understanding of both transmission channels of linking trade liberalization impact and the farm-household production framework (as in the previous sections) assists with conceptualization and analysis of how rice farm-households in Vietnam can respond to external impacts. Under stress, the commercial temptation is to hold back less (and aim to compensate at some future time). For fully commercial farms where inputs and outputs are bought and sold in national or export markets, strains appear in accounts as reported (lesser) profits while wages are still paid. For pure-subsistence or opportunistic farms, the strains are embedded in people's lives and development, with reporting through proxy measures (such as illness, school attendance, and social decline). A mix of effects can be felt by semi-commercial farms dependent on choices made. Responses through formal supply processes repeated across many farms within a specific geographical region change regional supply chains. Next chapter will devote to examine rice value chain in Mekong River Delta as a typical supply chain in a trade exposed region. Factors affecting rice farmer's welfare as well as farmer's response to trade liberalization impacts will be identified.

4.5 CHAPTER SUMMARY

In summary, Chapter 4 has provided a contextual framework and methodological links for this research. A framework of farm-household production applicable to the Vietnamese rice farm household has been developed to accommodate and illustrate the operation of three typical patterns of rice production, various linkages and transmission channels of trade liberalization impact on farmer's welfare. This can be used to show that the assumption of complete pass-through impact might not be true and the three price influences (local, national and global prices) need not coincide. At the centre of this process, a representative farm household as an entity with internal units has different choices of selling their production and response decision was made in anticipation of the existence of these influences on performance and welfare in the context of trade liberalization. In next chapter, the dissertation will discuss in detail the rice value chain and the complex of price settings in Vietnam's rice sector which might suppress rice farmer's income and welfare.

Chapter 5: Rice farmer welfare in Value Chain analysis

5.1. INTRODUCTION

This chapter first selects and analyses the MRD's rice value chain as a stylized value chain of Vietnam's rice sector in section 5.2. The chain structure depicted in a value chain map helps to clarify linkage and interactions between actors along the country's rice production chain. From sequencing descriptions and analysis, the chapter also provides a comprehensive assessment of the current situation, market position, and competitiveness of Vietnam's rice-growing households. In general, the rice value chain analysis explains ways by which rice farmers in Vietnam have apparently been marginally disadvantaged and gained less than expected from trade liberalization expected. This chapter unveils constraints and factors that prevent transmission effects on rice households' welfare improvement. Discussion of rice policy and rice price setting in Vietnam also helps to identify associated policy issues.

5.2. RICE FARMER RETURN AND VALUE CHAIN INFLUENCES

5.2.1. Mekong River Delta rice value chain's structure

In Vietnam, the channels by which rice moves from the producers to the end-customers are complex and vary according to region. As the two deltas, RRD and MRD, account for almost 70% of Vietnamese rice production and more than 95% of rice exports annually, the focus of this section is on the rice value chain, which is predominant in these two regions.

An illustrative rice value chain in the MRD region of Vietnam is presented in Figure 5-1.[28] The estimated percentage of paddy or rice sale flows are adapted from

[28] In the RRD region, the rice value chain is similar in structure and participating actors to the MRD. However, in smaller regions there may be fewer actors and differences in transportation means due to differences in topographic and geographic conditions (see details in ACI 2002. Rice Value Chain Study: Viet Nam. *Report prepared for the World Bank by Agrifood Consulting International (ACI).* Hanoi, Vietnam.. There were also studies on the rice value chain in Vietnam's other regions, such as Dien Bien Province in ACI 2006. Rice Value Chains in Dien Bien Province, Vietnam. *Report prepared for the SNV Netherlands Development Organisation by Agrifood Consulting International (ACI).* Hanoi, Vietnam..

study by Vo and Nguyen (2011). Both the export rice value chain and domestic rice value chain are included in the graph. With regard to the rice export chain, the graph shows four alternative channels for paddy/rice to be marketed from farmers to import markets:

A. *1-step channel:* a direct linkage between farmers and *food companies* (or *rice exporters*) before being exported. In this channel, food companies handle all other steps of processing paddy into rice for export purpose. In reality, food companies are also exporters usually own processing equipment or plants (i.e. husking, milling, polishing, packaging processes) for transforming paddy to rice. As shown by the graph, although only 4.2% of paddy sales go through this channel, this is obviously the shortest channel for government policies and international trade activities affecting the paddy farmers' welfare.
B. *2-step channels:* paddy rice from farmers has been going through one other agent: (i) *collectors* or (ii) *millers* before being exported by *food companies*. In the graph, the arrow of 47.8% paddy rice volume linked between collectors and food companies proves the domination of this channel within the current chain.
C. *3-step channels:* represents by rice export process that involving three agents along the chain: (i) *miller*, (ii) *polishing factories*, and (iii) *food companies*. In the graph, only 2.7% of farmers' paddy-marketed volume has been sold directly to *millers* without going through collectors.
D. *4-step channels:* before reaching the foreign market, farmers' paddy rice has been traded through four chain agents who are *collectors*, *millers*, *polishing factories* and *food companies*.

According to percentage showing in the graph, more than 70% of total marketed-rice volume in MRD region is for exports while the rest is to meet domestic demand.

Regarding the domestic rice chain, there exists a 5-*step channel* for paddy rice reaching the domestic consumers when all of the chain agents are involved: *collectors*, *millers*, *polishing factories*, *food companies* and *wholesalers*/*retailer*s. Not only food companies but other chain agents of collectors, millers, polishing factories play roles of rice suppliers to the network of domestic wholesalers and retailers. The percentage of rice volume supplied to wholesalers/retailers by each

chain agents are 6.2%, 15%, 1.3%, and 7.2%, respectively. In Vietnam, the domestic market has also been considered as a back-up market that is available in the case when rice cannot be exported due to variety of reasons such as failing to meet importing markets' standards and requirements, or because of trade restricting policies from either importing countries or Vietnam's government.

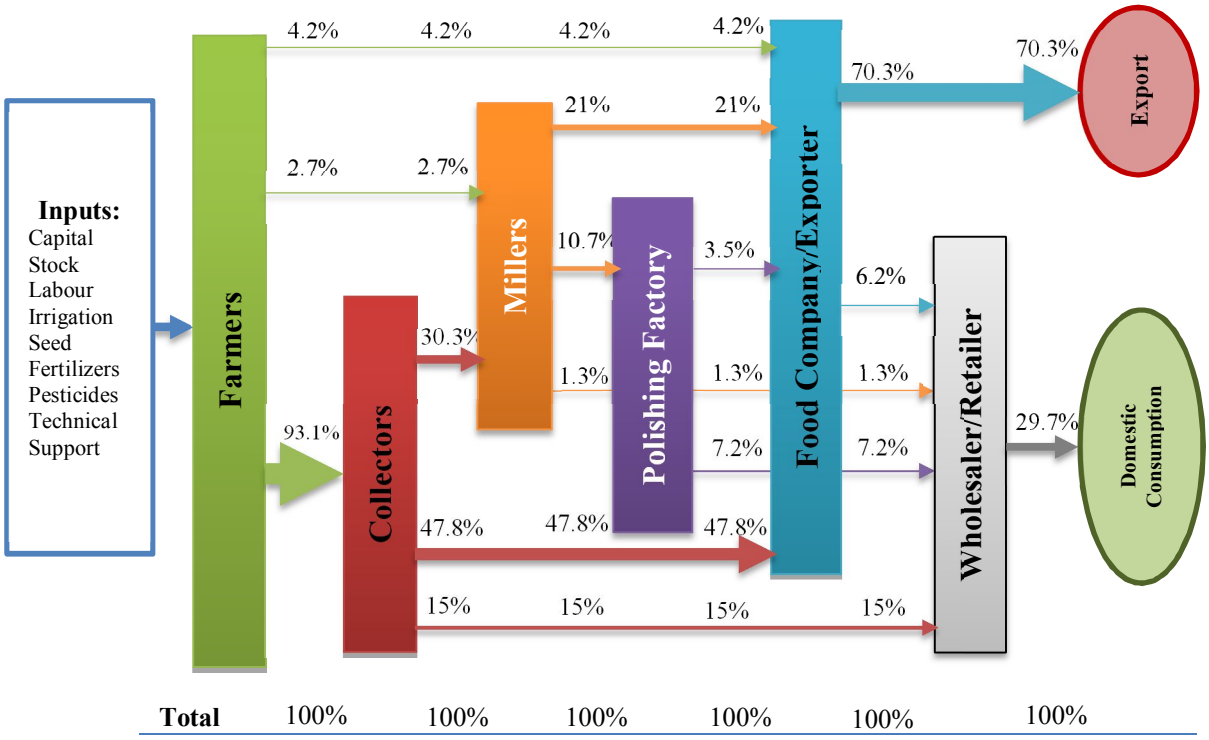

Figure 5-1: Export and domestic rice value chain in Mekong River Delta

Source: Adapted from Vo and Nguyen (2011)

A prominent feature of the present value chain is the domination of rice *collectors* and *food companies* in the middle between rice farmers and the consumption markets. While *rice collectors* account for 93.1% of farmers' marketed output, *food companies* take up to 85% of total volume selling out to the markets (in which for exports accounts for 70.3%). From collectors, nearly half of paddy rice volume (47.8%) has been gone direct to food companies before being exported or sold in domestic market via wholesalers/retailers. There is about 15% of paddy volume processed by the collectors and sold for domestic market via wholesalers/retailers. In fact, in MRD region, some large collectors have invested in their own processing equipment or plants. The remaining paddy rice volume

(30.3%), which has been collected by small local collectors, will go through either all or some other chain agents to reach consumers. These percentages highlight the central role of rice collectors (also described in this study as private traders/collectors) who handle more than 90% of paddy rice volume at the farm-gate before passing to other actors along the chain in MRD region.

5.2.2. Chain component characteristics

This section is to analyse in details the role of each actor along the rice value chain in MRD region, thus, provide further insights into the nature of the rice market and bargaining power of Vietnamese rice growers.

Farmers

In the MRD region, farmers sell approximately two third (68%) of their paddy output, keeping the rest for seed, animal feed, and home consumption (ACI, 2002). They tend to sell surplus paddy immediately at harvest in order to repay debts, which farmers have acquired before and during the rice-growing period. Such financial constraints couples with other limitations of small land area cultivation, lack of proper storage, and transportation make farmers largely as price-takers with little ability to raise prices on their own. Such situation is often more unfavourable for rice farmers during the harvest times when high paddy supply lead to a selling competitiveness among rice-growers. They may have alternative options of supplying their produce directly to commodity markets with less intermediary agents but in doing so they have to face greater risks due to the high volatility of rice prices. As shown in the value chain in Figure 5-1, more than 93% of the farmers' paddy output is reported as sold to collectors, while only about 7% is sold to either millers (2.7%) or directly to food companies (4.2%). The dominance of private collectors as the main assemblers in paddy rice procuring after harvests at the farm gate is a typical characteristic not only of the MRD region, but also other regions.[29] It is arguing that Vietnamese farmers' bargaining power has been partly restricted by the dominance of collectors.

[29] According to the 1996 IFPRI survey of rice farmers, private collectors/ (or) assemblers account for 96.5% of paddy purchases from farmers in every region of the country. IFPRI 1996. Rice Market Monitoring and Policy Options Study. *In:* AHMED, R., GOLETTI, F., MINOT, N., BERRY, P., BAUTISTA, R., NGUYEN, V. H. & NGUYEN, T. B. (eds.) *Final Report for Asian Development Bank (ADB), TA No. 2224-VIE.* Washington, D.C. 20006 U.S.A: International Food Policy Research Institute (IFPRI)..

Besides the issue of collectors' domination, two other important factors also affect the farmers' returns from rice production. The first issue is the post-harvest losses which is directly attributable to poor technologies. Post-harvest losses occur as a result of the lack of proper storage facilities (farmers often use small storehouses or their own houses for storage) as well as inadequate paddy drying technology which does not allow farmers to retain as much rice as they should for later sale when the market is in over-supply, especially at the time of crop harvesting. Without proper drying systems due to financial constraints, most Vietnamese farmers prefer sun drying to save costs. However, because sun drying is often accompanied with other constraints (such as changing weather conditions, space for drying, and hygiene issues), farmers usually option to sell their wet paddy to collectors right after harvesting on the field. This position will certainly bring farmers with weak bargaining power and they often accept considerably lower price offers. Other reason to sell wet paddy on field is longer delays mean a higher water loss, which causes shrinkage and loss of weight of their wet paddy harvest. The study of Tran et al. (2013) shows that there was only 5% of farmers in MRD selling dry paddy to collectors. In reality, few rice farmers have the capacity and resources to support reasonable bargaining power in paddy/rice sales unless they are vertically integrated in a supply chain with other actors on a contract basis.

The second issue concerns seed improvement of rice varieties. A characteristic of rice production in Vietnam is the use of quite a large number of rice varieties, even within a region of similar geographical and climate conditions. This has led to large volumes of unequal quality rice being produced for export purposes. Therefore, rice exports from Vietnam are often sold at a significant price discount relative to other rice exporting countries such as Thailand (Nielsen, 2002).

Moreover, rice farmers in Vietnam are heavily reliant upon locally produced farm-saved seed (Purcell, 2006). This dependence reduces seed purity which in turns potentially decreases quality and yield over time. In general, Vietnamese farmers essentially use two types of paddy seed in rice production: inbred and hybrid varieties. While domestic producers are almost self-sufficient in inbred seeds, up to two-thirds of hybrid seeds are currently sourced from imports. China accounts for the biggest import share (about 65%) and other countries such as Japan and India make up the rest. There appears to be more Chinese imported varieties grown in the north,

due to the proximity and adaptability of Chinese varieties, with more inbred and improved varieties grown in the south. The majority of rice production in the northern region of Vietnam is based on imported or hybrid rice production (57-58%) (ACI, 2002).

Collectors

Rice or paddy collectors play an essential role in the rice value chain. Paddy collectors provide important services, particularly where the basic trading infrastructure is not sufficient (Dooren, 2005). In Vietnam, paddy collectors are commercially acute, flexible, and have the advantage of being able to access many remote farms with their own transportation means (boats or carts in the south, or motorbikes, three wheeled vehicles, or small truck in the north and central regions) for paddy purchases. As the majority of farmers do not have transportation, they are dependent on collectors. Small collectors with only transportation means and no storage, can easily access rice fields for paddy purchase then sell directly to larger collectors, who can invest in their own storage system, milling equipment, and machinery to transform the paddy into brown rice or raw white rice. Thus, as showed in the Figure 5-1, collectors typically sell the paddy to millers (30.3%) or the paddy or brown rice to food companies (47.8%). About 15% of the white rice, which is processed by collectors, is sold directly to wholesalers or retailers before reaching the end-user in domestic markets. Food companies, which often have a network of affiliate processing plants – husking, milling, polishing, packaging, etc. - under their management are responsible for processing paddies into white rice for markets, both export or domestic.

Tran et al. (2013) found that paddy collectors can get benefit about ten times more than rice farmers by their active participation in the value chain. Furthermore, they also usually prove their market power over farmers by setting low prices, particularly if there is a surplus of paddy supply (Pham and La, 2014). Additionally, as most farmers are often short of capital or cash to pay for input costs. This makes them easy prey for merchant creditors who demand high rates of interest on loans and repayment of past debts in kind. Farmers therefore often have to sell their output urgently after harvest in order to accommodate debts, rent, fertilizers, or pesticides purchased on credit, hired labour at harvest, as well as to buy other necessities, and to meet other costs (Dooren, 2005, Tran et al., 2013). This poor bargain power

usually drives the actual farm-gate price lower than the floor farm-gate price recommended or set by the government.

Millers

There are three types of milling operations involved in the production of rice in Vietnam: specialized milling operations (pure millers), specialized polishing operations (polishers), and integrated milling and polishing operations (miller-polishers) (ACI, 2002). Thirty percent of the paddy volume handled by collectors is sold to millers, predominantly medium and large millers with husking and polishing services. Polishers are specialized mills that engage only in polishing activities for domestic consumption and export. Unlike pure millers, polishers do not procure paddies from farmers or collectors; rather, they purchase raw rice and re-process into polished rice. The majority of polishers are located in the MRD region. Miller-polishers are the most sophisticated form of milling operation in Vietnam and have the capacity to processing paddies into polished rice suitable for export markets (IFPRI, 1996). As shown in Figure 5-11, two thirds of the rice volume handled by millers (21% out of the 33% of total rice volume) was sold to food companies. Approximately 10.7% of total rice volume has to go through polishing factories before being sold to food companies (3.5%), or to wholesalers, or retailer networks (7.2%). Only a small portion of rice processed by millers (1.3%) goes directly to the wholesaler or retailer network to serve the domestic market. A recent survey showed that millers tend to act as service providers of rice processing for collectors instead of being actors along the value chain in their own right (Tran et al., 2013).

Food companies/Rice exporters

Most food companies in the rice sector in Vietnam are SOEs, including provincial food companies, including the two regional food corporations, Vinafood I (for the north) and Vinafood II (for the south) and their affiliates. These SOEs play an important role in the export of rice. Despite the opening of export to the private sector, only 4% of exports are handled by non-SOEs. SOEs often negotiate and sign contracts on a government to government (G2G) basis with foreign buyers, then transfer to the provincial food companies and millers the task of supplying rice to fulfil these contracts. Provincial food companies will procure rice from collectors and medium to large millers. G2G contracts are often signed approximately one year before delivery. In most cases, the risk associated with price fluctuations are

absorbed entirely by the food companies and millers (ACI, 2002, IFPRI, 1996). Recently, the share of rice export under G2G contracts has tended to fall (from 66.4% in 2007 to 42.7% in 2009), but still accounts for about 50% of total rice exports (Tran et al., 2013).

An imperfect competition exists among Vietnamese rice exporters. At present, there are more than 200 rice exporters[30] most of them SOEs and the rest joint-stock or private enterprises. Rice exported through G2G contracts also account for nearly 50% of total annual rice exports and 80% of the total contracted volume allocated to VFA members (Tran et al., 2013). As SOEs have little incentive to improve performance and G2G contracts do not require high-quality rice, these public exporters have become less active in searching for new markets or improving the quality of exported rice. As a result, Vietnam's current export prices are typically the lowest when compared to those of Thailand, India, and Pakistan (Pham and La, 2014). The export value chain of Vietnam's rice sector can therefore be seen as a typical chain with buyer-driven governance styles where all market power accrues to the subsequent actors along the value chain.

Wholesaler and Retailers

Wholesalers and retailers in the value chain are responsible for supplying rice to end-users in the domestic market. They handle up to 29.7% of the total rice output in the whole chain, the supply coming from food companies (6.2%) millers (8.5%), and from collectors (15%). There are differences in the actual roles of wholesalers or retailers across regions in terms of linkage with farmers. Most retailers, particularly in the north, purchase paddy directly from farmers. Further south, the diversity of purchases increases. For instance, in the North Central Coast and South Central Coast, wholesales and collectors are the source of some purchases, while in the Central Highlands, wholesalers are the exclusive source of paddy purchases (ACI, 2002). As shown in Figure 5-1, collectors are one of the main links between farmers, wholesalers, and retailers before reaching the domestic market (accounting for half of the rice output that goes through wholesalers and retailers).[31]

[30] In which VFA members are 149 (2015 data from VFA's website: http://www.vietfood.org.vn)
[31] Appendix 3 summarizes the characteristics and functions of actors along the Vietnam's rice value chain

Within the whole rice value chain, if it is assumed that there is only a certain value of profit margin available, then how this margin is spread across the actors depends on the structure of the value system and conduct within it. Each actor will seek to use their market position and bargaining power to secure a higher proportion position of this margin. Alternatively, actors can also cooperate to improve their efficiency and costs in seeking a higher total margin benefitting all actors. The fact of observed incomplete pass-through from export price to farm-gate price in the MRD rice value chain may be attributed to the various actions of those acting as intermediaries along the chain. Those intermediaries participate either as 'real' value-added actors in the chain or as opportunists who are searching for rents by taking the advantage of their power position. As next discussed, even where government policy is pro-farmer, the domination of opaque multi-steps channels plus the asymmetric power environment in which rice farmers have a disadvantageous negotiating position, ensures that farmers gain a lesser proportion of margin.

5.3. RICE PRICE SETTING IN VIETNAM

5.3.1. Rice price policies and their impact on farmer welfare

Recognizing the importance of the rice sector, the government has issued and applied a broad range of policy and program tools, with a mix of different instruments to promote (or otherwise influence) rice production and rice trading. These are based chiefly on food security considerations, and provide support and incentives to rice growers. The policies and programs include restrictions on land use regulation, paddy rice production targets[32], direct state trading operations, subsidized financing state enterprise paddy/rice purchases, imposition of a price 'floor' for paddy purchases and exports, G2G transactions/contracts, and targets or managed limits on annual rice exports. In addition to trade-related policy tools, other rice production-directives and support policies have also been implemented to achieve the above mentioned targets in the rice sector. Some key policies have included those relating to physical investments and management practices to ensure ample irrigation water (and flood control) for paddy production, plant varietal research, foundation seed production, subsidies and technical support for mechanization, tax concession, and financing for public investment in rice storage capacity.

[32] Which have been discussed in Chapter 2, section 2.4.3

Rice price setting in Vietnam

In Vietnam, paddy rice prices reflect the interplay of both market forces and the intervention of government policies (Nguyen and Talbot, 2013). Generally, domestic rice prices are determined by the market mechanism. However, when rice prices are volatile, the government intervenes due to the importance of rice crops in Vietnamese farmers' diet and livelihood. In fact, governmental interventions have been legalized by a National Assembly's Ordinance[33] since 2002, when rice and other agricultural products were selected as an important cereal commodity to which measures for price stabilization could be applied. During the course of economic reform and the trade liberalization process since 1989, various policy measures that directly and indirectly influence the rice prices in Vietnam have been designed and implemented.

Although Vietnam's domestic market has achieved a certain level of integration, considerable regional price dispersion remains and this indicates the persistence of transportation costs, transaction costs, and other frictions (Nguyen and Talbot, 2013). The percentage difference in rice prices across Vietnam is relatively large: the gap for paddy rice between the highest priced region and the lowest rose from 15.5% over 1996-1999 to 26.8% in 2000-2002. More recent data (IPSARD, 2006) shows the percentage gap between rice prices in the RRD and MRD has doubled from 10.3% to 20.2%. This price dispersion across Vietnam has created friction for cross-province arbitrage and regional differences in production costs and efficiency (Nguyen and Talbot, 2013).

The linkage between the domestic rice market and export markets also influences domestic rice prices and then impacts on farmers' welfare. Vietnam's domestic rice market has a close link with the global rice markets and domestic rice prices are co-integrated to export prices in the long-run (Tsukada, 2011, Lutz et al., 2006). However, export prices are not the single dominant factor that influences the formation of domestic rice prices. According to Tsukada (2011), the effect of global markets on domestic rice prices are relatively weak and partially offset by the rice-export policy.

[33] The Ordinance on Price No. 40/2002/PL-UBTVQH10 issued by the Standing Committee of the National Assembly, dated 26 April, 2002.

Price floor policy

In theory, a price floor is the lowest legal price at which a commodity can be sold. Price floors are used by the government to prevent prices from being decreased too low and are often applied in the agricultural sector to protect farmers. For a floor price policy to be effective, the floor price level must be set above the equilibrium price, otherwise the market will not sell below equilibrium, and the floor price may become irrelevant.

In recent years, when rice prices became highly volatile, the Vietnamese government implemented a number of price policy instruments aimed at ensuring a minimum profit of at least 30% over production cost for rice farmers[34] (Tran et al., 2013). The main instrument consists of a price floor, both for rice exports (called minimum export FOB prices) and for paddy purchases from farmers (called directed paddy price or minimum farm-gate prices). Exporters are requested not to sell rice for a price lower than the advised floor export free-on-board (FOB) price, the level of which is set on the assumption that exporters would buy the paddy directly from farmers for the recommended floor farm gate price. These FOB prices were announced periodically by the government's authorized agency, Vietnam Food Association (VFA) under the supervision of the Ministry of Finance (MOF), and Ministry of Industry and Trade (MOIT). The regulating mechanism of directed prices was stipulated in the Decree No.109/2010/NĐ-CP: *"When the market price of commodity rice is equal to or higher than the directed price of paddy, the government makes no interventions. However, when the market price of paddy is lower than the directed price, government's ministries and agencies[35] will take specific measures to keep the market price of commodity rice and farm-gate paddy price above the directed prices while ensuring efficient rice export"*.

However, the regulations on rice price floor need to be accompanied by an effective compliance monitoring mechanism. In reality, the floor price policy was applied as a measure to prevent the phenomenon of reducing export prices to gain market share among Vietnamese export companies. Whenever their inventory is high

[34] This number was stated in Resolution No. 63/NQ-CP dated December 23, 2009 on National Food Security issued by Vietnamese Government.
[35] Ministries and agencies include Ministry of Agriculture and Rural Development (MARD), Ministry of Finance (MOF), Ministry of Industry and Trade (MOIT), State Bank of Vietnam (SBV) and Vietnam Food Association (VFA).

with the prospect of good harvests, rice export companies or corporations are often willing to offer low bidding prices in export contracts as a way to increase their export volume and hence their export revenue and margins. Foreign rice importers then also exploit this low bidding price to stress back the export prices in following contracts, thus creating a disadvantaged position for Vietnamese rice in the international market. The floor price policy has been described as being neither effective nor beneficial to rice producers. Trading companies, following their aim of profit maximization, take advantage of their dominating market power position in the rice value chain to offer low farm-gate prices to rice farmers. Such dual-monopoly power explains why most rice price margins have accrued to trading actors other than farmers in the rice value chain. Another fact making the implementation of the floor price or directed exporting price policy less effective is its rigidity while the market prices, especially international prices, are highly variable.

State direct trading and rice procurement policy

Procurement policies are considered a regular and popular intervention by the Vietnamese government in the rice sector. These policies are often based on the circumstances of each rice harvest during the year. When there is a high volume of harvested paddy output predicted which will drive farm-gate prices down due to over-supply, the government is able to procure part of the paddy/rice output (usually called temporary storage procurement programs). Under these policies, the government usually allows rice trading enterprises (exporters or food corporations) to access interest-free or subsidized-interest-rate loans for buying paddy/rice directly from farmers during a certain period of time (often three to four months). These procurement policies are often applied together with the price floor policy, as they aim to push up demand, thus avoiding a reduction in prices and are targeted to ensure a higher margin for paddy growers.

At first glance, these policies seem to be potentially effective and pro-farmer, as they are applied at specific critical times often just before crop harvesting, and when the paddy/rice prices in the domestic market are at their lowest or in a downtrend due to a prediction of oversupply in the short-term. In practice paddy/rice prices usually tend to increase after procurement policies are released (Tran et al., 2013). However, it is not easy for procurement policies to achieve the targeted policy effectiveness for a number of reasons. First, is the issue of precise determination of

the procuring price that exporters pay to farmers (as most farmers do not sell directly to exporters, but to different middlemen in the value chain (as discussed in the rice value chain section). In fact, the procurement policy is usually implemented in parallel with the floor price policy. However, the issued floor prices for domestic procurement are not always flexible enough to achieve the target of "at least 30% of profit" for rice farmers. Second, upon receiving subsidized loans from banks assigned by the government, food companies or rice exporters are often reluctant or withhold their buying in when the paddy/rice price is high, and only buy in when the price has gone down. This means farmers often have to sell their paddy at the harvest's peak at a very low price and often to rice collectors. The weak position of rice farmers also reveals the market power of rice exporters in Vietnam's rice value chain. Third, harvest time varies across regions and provinces, but the duration for procurement policy to be carried out is often fixed for a certain period (for example, the most recent such policy was from March 1st to April 15th of 2015, which targeted the winter-spring crop in southern provinces) possibly leading to policy ineffectiveness.

Similar to the floor price policy, it is argued that government's procurement policies are also not beneficial to paddy farmers, with most benefits captured by other players along the value chain. These two policies are blamed as being ineffective tools for influencing producer prices, while providing a highly unequal 'playing field' in the competition among trading enterprises, especially that between SOEs and private companies. Furthermore, these policies are applied in an ad-hoc and non-transparent manner that creates unsustainable financial outlay (ISG-MARD, 2011). Different solutions have been designed to improve the effectiveness of these policies, such as providing subsidized loans for both farmers and enterprises who sign contracts to buy a paddy from farmers after harvesting. With this loan access, farmers can store the paddy at home and sell whenever they want. However, an issue arising is that the storage capacity of farmers and enterprises has not reached a sufficient level to meet the requirements (Tran et al., 2013). There are some strong put arguments that claim the government should abandon its policy of announced 'price floor' and subsidized financing for enterprises to buy up paddies or rice in the situation of predicted over supply during harvesting times. The justification of this

argument will be further clarified in the following section of rice value chain analysis.

Producer prices can be improved by strengthening the farmers' position within the value chain via their storage ability, preliminary processing (dry up paddy), and through the development of long-term partnerships with down-stream actors of the chain, such as millers and trading companies.

5.3.2. Price changes and welfare of rice farmers

Tran et al. (2013) found that rice farmers were the group that received the least benefits during the rice price spike in 2008. Furthermore, when comparing the margin that rice farmers received from their own rice production with the total margin from rice production and trading, a rapid decline in benefits for farmers was also evident. In 2006, when the rice prices were very low, farmers could earn 70% of total benefits from rice production and trading, but in 2008 during the high prices, farmers could earn only 23% and this fell to 10% in 2010 (Tran et al., 2013).

Farm-gate price vs. export prices during peak prices period

As mentioned in the rice value chain (Figure 5-1), exporters and food companies or even domestic retailers buy very little paddy from farmers: rather, they purchase brown or white rice from millers, polishers, or collectors. Thus, the government's floor price policy, which is based on the direct links between farmers and food companies or exporters, has been pre-empted for various reasons.

Rice prices spiked in 2008, and while the government intervened with a temporary export ban over a short period, rice farmers had to deal with both low paddy prices and high production costs. This can be illustrated by the gap between the export price and farm-gate paddy price in Vietnam's rice sector in 2007-2008. While the export price jumped from $430/ton in early 2008 to over $900/ton in May 2008, the farm-gate price increased only by $100/ton (Tran et al., 2013) (Figure 5-2).

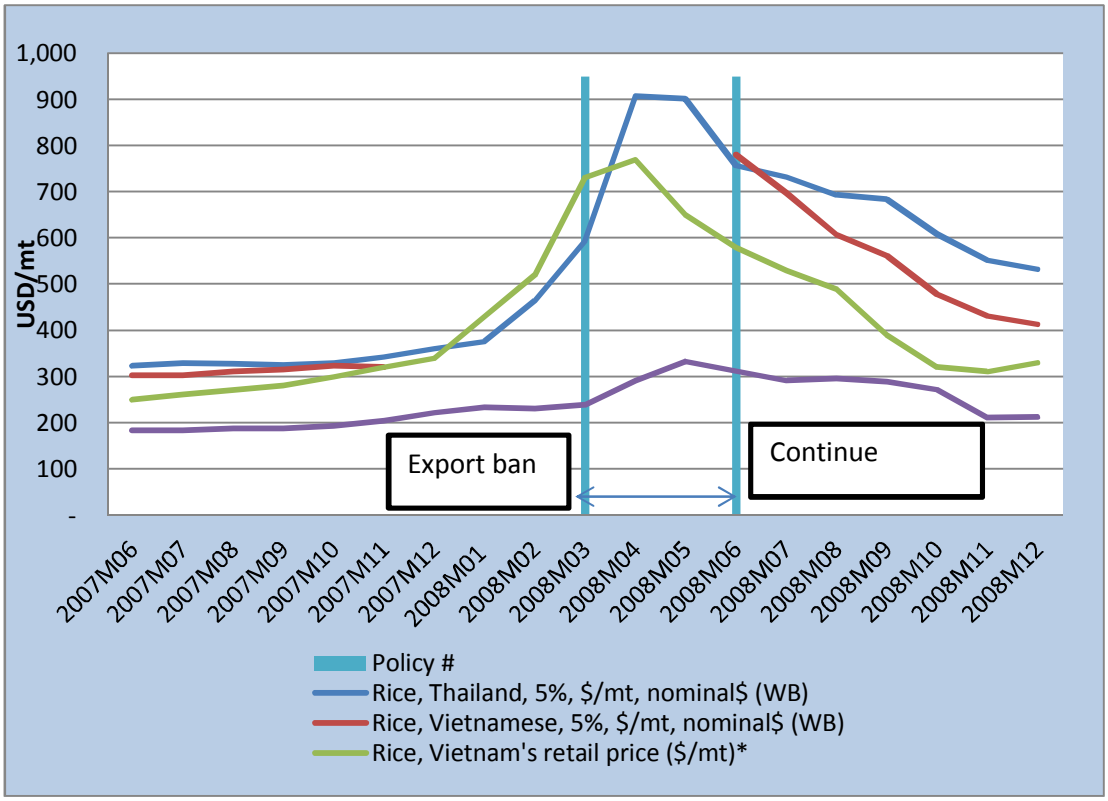

Figure 5-2: Export ban polices and Vietnam's rice price in 2008

Sources:*Food security Portal (US); World Data Bank (WB)[36]; Tran et al. (2013).

Margin comparison between actors the rice value chain

According to a survey by the Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD) in 2012, there was an unfair distribution of benefits among rice value chain actors, as illustrated in Table 5-1. Rice farmers paid a higher proportion of the total cost (63%), but received less total value added (55%) compared with the two other important actors who dominate the whole value chain. Collectors and export enterprises each contributed just 18% of the total unit cost in rice production, but gained 32% and 13% of the total unit margin per kilogram of rice, respectively.

However, Table 5-1 also shows that while the marketing margin accruing to rice farmers was relatively high at around 55%, other actors along the chain operated on volumes rather than margin percentages. The total margin of a rice household is limited by their own average cultivated land area. Trade liberalization benefits have

[36] http://www.foodsecurityportal.org/api/countries/world-rice-price; http://databank.worldbank.org/data/views/reports/tableview.aspx;

therefore accrued to wealthier and land-rich households, rather than poor and small-land owned households (Purcell, 2006).

Table 5-1: Margin analysis of export rice value chain in 2012

Actor	Total costs	Unit cost per actor		Price received	Unit margin per actor		Average volume per actor per year	Total margin
	VND/kg	*VND/kg*	*%*	*VND/kg*	*VND/kg*	*%*	*Tons*	*'000 VND*
Farmers	3,800	3,800	63	4,850	1,050	55	26	27,300
Collectors	4,900	1,100	18	5,500	600	32	500	300,000
Exporters	6,000	1,100	18	6,250	250	13	100,000	25,000,000
Total		6,000	100		1,900	100		

Source: IPSARD's survey 2012, from (Tran et al., 2013)

The apparent lack of capacity of public exporters to bargain for a higher export price of Vietnamese rice puts pressure on them to lower the domestic price of rice to maximize their margin. Therefore, public exporters prefer to buy the paddy or rice from collectors rather than directly from farmers, as this allows them to avoid paying the official floor farm gate price for the paddy. The government currently lacks enforcement measures, so collectors, who are non-registered entities (i.e. operate in the informal sector), can evade the floor farm gate price enforcement. As a result, in the event of a good crop season, the paddy price paid to farmers falls and exporters benefit from the lower prices offered by collectors. Each year, the Vietnamese government spends a certain budget to shore up rice prices, but in fact, the rice collectors, exporters, and even wholesalers are those who benefit from this price support.

Other aspects preventing a direct linkage between paddy rice farmers and exporters are high transportation as well as transaction costs. Despite the better comparative endowment in terms of land area for each household, the paddy/rice fields MRD region are still considered as small and fragmented (which mostly have a size of 0.5 to 2 hectares as mentioned in chapter 2). A prominent characteristic of the MRD region is the existence of interlacing drainage and irrigation canal systems, which connects fields and serve as transportation routes. Boat transportation has long been the only means for transporting paddies from the fields to the market in large volume in the region. Given the fact of households grow their rice in small fields, it

is not efficient for exporters to set up their own transportation team and deliver the transportation service to each small individual farmers. Moreover, even if exporters could buy directly from farmers, it would be costly (in terms of transportation costs and losses directly attributed to transport) and less convenient (in terms of differences in harvest time). That is why private collectors, who own many small boats, have long played a key role in connecting small farmers who produce only limited output of rice for sale with exporters who require large volumes of paddies to fulfil their export contracts (Pham and La, 2014).

Due to the multi-layered rice value chain and the lack of mechanism to effectively enforce the floor prices, efforts by the Vietnamese government to ensure a minimum rate of return for farmers by imposing price floors have not been successful.

To address existing constraints and help farmers increase their income from growing rice, local authorities in the MRD area have designed and are currently piloting a set of policy measures under a project called the Large-Scale Field Model (LSFM). Pham and La (2014) found that when LSFM was implemented it helped to increase the farm gate price, reduce the production cost, and increase productivity in the MRD.

Figure 5-3 below shows the design of the LSFM, which represents an upgrade along the full length of the current rice value chain described in Figure 5-1. The core of the intervention is to set up a large-scale field with the participation and cooperation of farmers and rice exporters. Besides, the long supply chain with various independent participants should be replaced by an integrated entity, named the Exporters in the graph. The Exporters who have capability of acquiring and carrying out all other functions which would have been belong to other actors along the value chain, will create a direct linkage with rice farmers. Once this linkage between farmers and exporters has been established, the various actors previously involved in the relationship between them (collectors, millers, and polishing factories) become superfluous, and paddies produced by farmers can be sold directly to exporters and their affiliates. This mechanism is targeted to achieve the advantages of economies of scale effect.

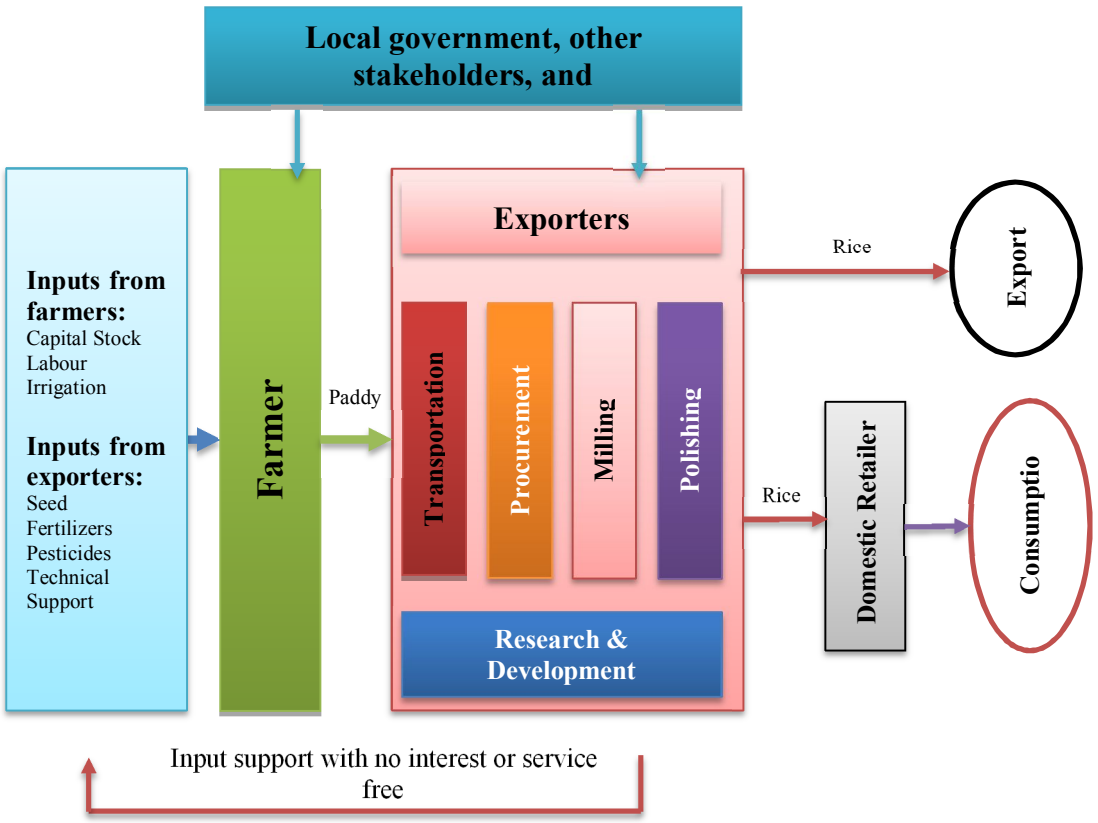

Figure 5-3: The LSFM – a value chain upgrading intervention

Source: (Pham and La, 2014)

According to study of Pham and La (2014), the mechanism of LSFM works as following steps:

- First step is consolidation of farm land to form large-scale fields for growing rice. Rice growing farm households with fragmented land plots are allowed to swap with other households without changing the ownership title over those land plots. By this way, a large-scale field can be set up under a common agreement among all participating small farmers, who continued to be responsible for the cultivation of a small portion of the aggregated large field.
- The second step require a rice exporting enterprise to coordinates the agglomeration of all the small farmers (as Exporters presented in Figure 5-3). This enterprise will take leading and important role as it is capable in carrying out all required intermediate processing steps such as transportation, procurement, milling, and polishing. However, the LSFM does not resemble the model of collective farming cooperatives that dominated Vietnam's agriculture before 'Doi Moi' (Renovation) in 1986. The LSFM is not about forming a public entity and its operation is to pursue the objectives of

efficiency and profit maximization rather than addressing the objectives of social welfare maximization set by the government.

- The third step involves rice production and processing. After having a farming agreement or contract with farmers, the rice exporting enterprise will provide rice farmers such following supports with purpose of controlling and assuring the quality of the growing paddy:
  (i) *rice production inputs* (e.g. seed, fertilizer, pesticides) often in the form of interest-free loans to farmers;
  (ii) *technical services* (e.g. new techniques in growing paddy, harvesting, or preserving and storage). These services can be conducted by the exporting enterprise's technical experts (if available) or in the form of technical cooperation between exporter's research centre (if any) and other agricultural research institutes;
  (iii) *free on-farm transportation and procurement services* (because the volume of crop harvested from the LSFM is large enough to set up on-farm silos, traditional transportation means such as boats or barges, are not necessary);
  (iv) *short-term storage free services* for paddy grain harvested, which allows farmers to keep the paddy for later sale; and
  (v) *a commitment to buy all harvested paddy from contracted farmers*. If farmers for any reason do not want to sell their paddy to the exporter, they have to compensate the exporter by refunding the input costs and other service costs provided, including costs of packaging, transportation costs, etc.

On one hand, the idea of applying the LSFM is set up a model of large-scale production in rice sector hence achieving economies of scale and reducing intermediary costs that might prevent welfare improvement of farmers. On the other hand, the LSFM can provide a secure and stable supply source of high-quality paddy grain for rice exporters. Consequently, with reliable quality supply the exporter could invest more in marketing and bargain for a higher export price on international markets. This would allow farmers and the rice exporters not only to share between them the profits from the increased export price, but also the risks associated with the farm households in rice production. However, despite designing advantages and

potential benefits, the LSFM model has just in pilot stages at certain provinces. Its multiplication to other regions still need to be further assessed along with suitable policies relating to various challenging issues such as farm-land consolidation and conversion.

5.4. CHAPTER SUMMARY

Four main conclusions can be drawn from this chapter. Firstly, from the rice value chain analysis, it is evident that Vietnamese rice farmers are in the most vulnerable position with regard to sharing the margin created along the chain. Small-scale, fragmented rice production at the household level coupled with a series of constraints (for example, lack of capital, credit access, or investment in storage systems) drive rice-growing farmers into a disadvantaged position with weak market bargaining power along the supply chain. In this way much of the benefits of the past remarkable increase in rice export volumes and prices achieved by Vietnam has been captured by downstream agents rather that farmers themselves.

Secondly, this study shows the critical role of intermediary actors along the rice value chain in terms of attracting profit margins, especially from rice exports. The dominant position of rice collectors and exporters/food companies in controlling the farm-gate price of rice is shown to be an important obstacle to allowing a complete price pass-through effect reaching rice growers. Given the characteristics of a typical buyer-driven value chain, the policy implications for Vietnam are how to coordinate, organize, and regulate activities of intermediary actor in the chain to produce a more equitable outcome.

Third, the analysis of rice policy and rice export management mechanisms highlight the inefficient implementation of the Vietnamese government's policies in this sector. This study therefore is made with the aim of providing empirically based evidence on which to base remedial agricultural policies and appropriate implementation strategies.

Fourth, although this chapter has focused on the rice value chain in the MRD as a representative sample, it is acknowledged that the nature, importance, and influence of intermediation can vary between regions within the country. Therefore, this study underlines the importance of accounting for regional difference in policy

design and implementation in the rice sector as well as for agricultural development in general.

Chapter 6: Does trade liberalization affect Vietnam rice farmers' welfare and poverty?[37]

6.1 INTRODUCTION

In Chapter 4, the dissertation presented a theoretical framework with three main transmission channels of trade liberalization impacts to farm household welfare - price, employment, and fiscal channel. Although each of these channels has an equally important role in analysing the welfare and poverty impact of trade liberalization, this dissertation is focussed on examining the first two impact channels given data constraints. Regarding price channel, as Winters et al. (2004) have indicated domestic markets often do not transmit effective price signals because of various reasons including monopolistic or monopsonistic behaviour of agents, inadequate transportation facilities and poor administration and management of trade policy. This dissertation argues that, in terms of a household's welfare experience, these effects will depend on how price are transmitted between the border and the farm household. Following on from this reasoning, Chapter 5 shows the mechanism by which Vietnam's Mekong River Delta rice farmers gain along the value chain and provides evidence that they are marginally disadvantaged in the process of trade liberalization. This dissertation's hypotheses based on the proposed framework, is therefore that price and employment changes flowing from trade reforms are directly associated with rice-growing households' welfare and poverty. However, this has not been empirically examined. Therefore, the primary purpose of this chapter is to provide empirical evidence of how price changes and employment factors impact on rice household welfare and poverty in Vietnam under trade liberalization.

Empirical literature on the relationship between trade liberalisation and poverty is rich and mostly focuses on income as seen in a series of literature review by (Winters, 2006, Winters, 2002a, Winters and Martuscelli, 2014, Winters et al., 2004,

[37] I would like to express my gratefulness and acknowledgement for the intellectual contribution of Dr. Vincent on this chapter. The chapter has benefited greatly from his advice and comments. As usual caveat applied, I am alone responsible for the chapter's remaining errors.

Winters, 2002b). In a cross-countries context, many empirical studies have established a negative association of trade liberalisation and income poverty via several pathways of impacts such as economic growth which in turn decreases income poverty.

Increasing numbers of recent studies have examined the impact of trade liberalisation using household data for many individual economies. Those studies have established substantial evidence that trade liberalisation could increase output prices, expand access to markets, reduce import prices, lower trade costs, create more employment with higher wages, as well as higher total factor productivity. All of these factors, if they favour the income of the poor, could help reduce poverty of households especially in less developed and developing economies.

Studies that have explored poverty dynamics and welfare impacts in Vietnam in a dynamic setup include Glewwe et al. (2002), Litchfield and Justino (2004), Niimi et al. (2004), and Justino et al. (2008). They all examined Vietnam households' poverty dynamics of the 1990s using the VLSSs of 1992-93 and 1997-98. One study by Hoang (2012) applied the Justino et al. (2008) methodology to examine the poverty dynamics changes in the 2000s in Vietnam and compared them to results from the 1990s using the VHLSS data from 2002 to 2008. A recent study by Le (2014b) focused on the linkage between institutional reform that accompanies trade liberalization and Vietnamese rural households' welfare. In that study, the author used only separate cross-sectional datasets of the VHLSS 2006 and 2010 to compare the changes overtime. There are still very few studies where dynamic welfare has been carried out in every possible aspect, especially using the all possible panel datasets of the VHLSSs from 2002 to 2012.

This chapter is targeted to examine the impact of trade liberalization on welfare and poverty issues of Vietnamese rice-growing farmers. However, poverty is a multidimensional concept (Alkire and Santos, 2014, Nussbaum and Sen, 1995). Obviously income is an important aspect of multidimensional poverty because income can be spent on a wide range of goods and services to satisfy and fulfil other basic human needs. There is growing interest in the analysis of multidimensional poverty in developing countries, especially since the launch of the Millennium Development Goals (MDGs) in 2000. According to Alkire and Santos (2014), the multidimensional poverty analysis complements income poverty analyses in the

developing countries by bringing information from a different angle, focused directly on actual deprivation. This poses interesting research inquiries into the relationship between trade liberalisation on multidimensional poverty in the context of developing economies. To the best of our knowledge, there are only few number of studies that focus on this trade and multidimensional poverty relationship in the literature; therefore, we aim to fill in this gap by investigating this issue in the context of Vietnam's rice-growing households.

Analysis of the impacts of trade liberation on poverty reduction in the community of rice growing farmers is important in Vietnam for three important reasons. First, poverty is always more apparent in rural areas where most of rice farmers are located regardless the country has achieved remarkable outcomes in reducing income poverty status. Second, in order to assess the impacts of trade liberalisation on multidimensional poverty through various channels including farm-gate prices of rice, off-farm wages and overall trade openness, we particularly look at a specific sector of the economy. Rice growing sector is chosen because rice is one of few crops that have seen the deepest transformation of Vietnam's rural economy and largest expansion in terms of production and export volumes. In other words, rice sector has high level of international trade exposure; therefore, analysis of this sector would provide meaningful policy implications for a transition economy like Vietnam.

This chapter differs from empirical studies that have some focus on Vietnam rice sector in several manners. First, it instead of using conventional unidimensional measures of household's welfare such as income or expenditure, we use a multi-dimensional deprivation index (MDI) which is constructed through the framework of latent class modelling. MDI complements income poverty analyses by bringing information from a different angle, focused directly on actual deprivation. In addition, it has been widely acknowledged that the reduction of income poverty is necessary, but not sufficient for sustained development and growth, especially for developing economies that have been successful in income poverty reduction (Alkire and Santos, 2014, Alkire and Foster, 2011). Second, in order to deal with the endogeneity issue of income and its associated determinants, we estimate an ordered probit regression using the conditional mixed process (CMP) estimator in the framework of maximum likelihood estimation. The use of CMP helps us particularly

examine the impacts of trade liberalisation on two sources of income (farm and non-farm) which in turn determines multidimensional deprivation. Thirdly, the study focusses on Vietnam's rice-producing households by measuring poverty status in particular, and welfare impact in general of both their rice income and non-rice income under the context of trade liberalization - captured using provincial level trade openness indices. Further details related to this process are explained in next section of this chapter. Last, for robustness analysis, six iterations of the Vietnam Household Living Standard Surveys (VHLSSs) data from 2002 to 2012 are used to construct six panel datasets of rice-growing households in Vietnam.

The rest of the chapter is organized as follows. Section 6.2 presents the theoretical and empirical framework for the possible channels through which trade liberalization can affect poverty and household welfare. Section 6.3 explains the empirical methodology. The household survey data sets and the statistics used in the analysis are described in Section 6.4. Sections 6.5 and 6.6 report the empirical results and conclusions respectively.

6.2 EMPIRICAL MODEL

6.2.1 Empirical model

This study takes a step further in exploiting the VHLSSs' rice household data availability by using a more advanced regression model employing CMP, where the issue of endogeneity in a simultaneous system of equations has already been accounted for. Moreover, the CMP is more flexible when the detection of instrument is difficult and could be arbitrate given the identification complexity with large scale of data of many years and many events in the years surveyed (Roodman, 2011).

Although there is similarity to the previous literature in terms of applying a partial equilibrium approach (focusing only on a certain mechanism or channel of trade liberalization impact) this study differs by investigating the relationship between trade liberalization and the multi-dimensional poverty index, where households are classified into three groups based on a manifest of living standard indicators. Furthermore, the regression model is also augmented by including covariates that help examine the link between rice-growing households with other players within Vietnam's rice value chain, as in Chapter 5's discussion.

This study examines the impact of trade liberalization on the possibility of household's poverty status using an ordered probit regression model as follows:

$$c_i^* = f(z_i, rice\_income_i, non\_rice\_income_i) \quad (1)$$

where c_i^* is the ordered outcome of poverty status.

z is the vector of covariates, which are hypothesized to be related to the ordered outcomes, and $rice\_income_i$ and $non\_rice\_income_i$ represent the income derived from rice production and non-rice activities of household *i* respectively.

However, being poor or not can affect work productivity, which determines income. Therefore, income can be an endogenous variable in (1). In addition, several socio-economic factors may affect income variables, which in turn lead to multi-dimensional poverty. The estimation of a fully observed recursive model was used in the framework of maximum likelihood estimation to take this endogeneity issue into account (Roodman, 2011). More specifically, this study adopts the following seemingly unrelated regression (SUR) model within the family of recursive models (where *i,* which represents each household/individual, is dropped for simplicity) using the **cmp** command in Stata package:

$$c^* = \sum_{j=1}^{m} \gamma_i z_j + rice\_income + non\_rice\_income + u_1 \quad (2)$$

where: $rice\_income = \alpha_1 + \sum_{j=1}^{n} \gamma_j v_j + u_2$, (3)
and $non\_rice\_ncome = \alpha_2 + \sum_{k=1}^{m} \gamma_k v_k + u_3$ (4)
in which v_j and v_k are the vector of covariates and u_h $(h = 1,2,3)$ are error terms.

6.2.2 Descriptions of variables used

All covariates in equations (2) – (4) are described in Table 6-2. The selection of these variables guided by previous empirical studies in Vietnam (Le, 2014a, Niimi et al., 2007a, Hoang et al., 2016, Mahadevan and Hoang, 2016) and other developing economies similar to Vietnam as reviewed in Winters and Martuscelli (2014) and (Winters et al., 2004) as well as data availability. Some variables are selected in order to serve our research purposes; therefore, we provide further discussions below.

Communal and provincial variables

The commune-level rice yield average is calculated as the arithmetic mean of rice yields of all rice farmers located in the same commune. This variable is designed to capture variations in the overall rice yield productivity. We expect that this variable is positively correlated with the level of deprivation as overall productivity does not only affects rice income but also promote higher living standards and level of development in the region.

We derive the total number of people employed in export-oriented industries (EOI) [38] at the commune level to capture the impact of trade liberalization on farmers' welfare through the employment channel. As classical trade theory has identified that unskilled labour is likely to benefit from export-oriented manufacturing industries (Heckscher - Ohlin theory); for that reason, we expect a positive relationship between this variable and the level of multidimensional deprivation.

Previous studies have used the ratios of exports to GDP and the ratio of trade (either exports, imports, or total import and export) to GDP to capture the impacts of trade openness (Le, 2014a). In a similar manner, we use provincial trade openness index, measured as the ratio of total trade to GDP at the provincial level.

Household variables & income covariates

As guided by relevant literature that focus on Vietnam, we use four household variables including household size, the ratio of working people in the household, the number of people having technical diploma and higher degree and the oversea remittance. We expect all of these variables would have a positive relationship with the multidimensional deprivation variable as the more people working and higher quality labour would translate into higher income and higher level of consumption.

The business of rice cultivation exhibits high variations across households in Vietnam. To capture the issues of crop specialisation and crop diversification, we include information if farmers also grow rice together with two types of crop:

[38] An export-oriented industry (EOI) is defined as one that has an export value exceeding its import value and stays within the top 20 list of industries having largest export values during the year of the survey.

vegetable and fruit crops and short-run industrial crops. These variables are expected to capture some differences in the nature of farming business where most of vegetable and fruit produce are for traded in local markets while other industrial crops are mainly for export purposes. To capture the scale effect of rice production we also include the ratio of land used for rice growing of farmers over commune's average value.

The dependent variable of poverty status

In this chapter, value of poverty status in the empirical model will be tested in two ways: (i) *Firstly*, it is the value of the class membership estimated from the latent class model (LCM) for the MDI classification; and (ii) *Secondly*, it uses the poverty statuses which were classified based on household income per capita of observation/household comparing with poverty line issued by government in correspondent year.

Alkire and Santos (2014) from the Oxford Poverty and Human Development Initiative (OPHI) point out that the MPI complements income poverty analyses in the developing world by bringing information from a different angle, being focused directly on actual deprivation. Income is an important aspect of multi-dimensional poverty, as income can be spent on a wide range of goods and services to satisfy and fulfil other basic human needs. Moreover, it has been widely acknowledged that the reduction of income poverty (which is unidimensional), is necessary, but not sufficient for sustained development and growth, especially for developing economies that have been successful in income poverty reduction (Mahadevan and Hoang, 2016).

Following Mahadevan and Hoang (2015), the latent class model (LCM) was used to classify sampled households into three classes of most, middle, and least deprived for the analysis. These three MDI clusters are comparable with the Vietnam government's current classification of income poverty: 'poor', 'close-to-poor', and 'non-poor' categories in official documents regarding poverty policy. Thus, the MPI classification has analytical compatibility, in addition to policy relevance in the current context of Vietnam.

This study selected ten indicators to capture the various manifestations of the multi-dimensional derivation status of households using information extracted from VHLSS questionnaires[39]. These indicators have been used in many other studies and mostly reflect the living standard dimension (Alkire and Santos (2014). In equation (2), the two endogenous variables, households' *rice income* and *non-rice income*, were hypothesized to be influenced by factors related to the household head and household members' demographic characteristics. Regarding the household head, as he/she is often the family's breadwinner, some factors were included in the equation, such as general education and vocational training (represented by technical diplomas he/she acquired) and the industry in which the household head was employed. With regards to employment of the household head, agricultural employment was considered as the base and a dummy was used for the industries of mining, manufacturing, and service. In terms of the household head's education, primary, secondary, and higher education were compared to the base case of no education.

6.2.3 Data and statistical descriptions

The study uses data from six surveys of Vietnam Household Living Standard Surveys (VHLSSs) from 2002 to 2012. These biennial surveys were implemented by the Vietnam General Statistics Office (GSO), under technical assistance from the World Bank (WB) and funded by the United Nation's Development Program (UNDP). The VHLSSs were the continuation of the Vietnam Living Standard Surveys (VLSS) of 1992/1993 and 1997/1998, which were multi-topic surveys patterned after the WB's Living Standard Measurement Surveys with nationally representative samples (Glewwe et al., 2004). After being superseding in 2002, the VHLSSs uses a rotating core-and-module designed survey with an expanded sample size intended to provide statistically representative samples of most provinces. Since 2004, over 9,000 households have been included in the income and expenditure sample of the VHLSSs[40]. Though the content of the household and commune questionnaires administered has evolved over time, the core information contained within the surveys facilitates the construction of a set of variables that are consistently defined across the survey years (Baulch and Vu, 2011). The *household*

[39] Details of Latent Class Model and MDI classification results are presented in Section 6.3
[40] The number of households surveyed in the income and expenditure part of the VHLSS 2002, 2004, 2006, 2008, 2010, and 2012 were 29530, 9189, 9188, 9189, 9399, and 9399 respectively.

survey contains detailed information on household characteristics including demographics, education, health, employment, housing, non-farm employment, food and non-food expenses, assets and consumer durables, and participating in the national target programs or credit. The *commune survey* provides information on infrastructure and institutions at the commune level. VHLSSs have been considered as comprehensive and methodologically sound surveys (Hoang et al., 2015). Although iterations of the survey had not observed the full set of same households consistently over years from 2002-2012 it is possible to construct panel datasets from every two (or three)[41] consecutive iterations given participating households were selected from same survey samples of national population census.[42] Panel data sets using in this study (Table 6-1) were constructed with reference to studies of (Le and Pham, 2009, McCaig, 2008, McCaig, 2009). The nature of 2-wave panel (with 3-year span) and 3-wave panel (with 5-year span) are sufficient to consider a medium term impact. However, this short-time frame nature of VHLSS panel data can make fixed effect regressions an issue by providing bias estimations.[43] Then the using of CMP model which is a built-in package to account for both the unobserved heterogeneity and endogeneity is suitable in this chapter.

In order to examine changes of multi-dimensional derivational status over time, six iterations of datasets were constructed into four two-year panel datasets (2002-2004, 2004-2006, 2006-2008, and 2010-2012) and two three-year panels (2002-2004-2006 and 2004-2006-2008). Due to the VHLSS's rotating panel design, in which half of the enumeration areas in each round are replaced by new enumeration areas, the size of the three-year panel is less than half the size of the two year panels.

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[41] According to VHLSS guidebooks, each year, there were about half of sampling households in previous survey replaced by new households in the later survey. These new households, however, were still randomly selected from the same sampling population which drawn based on national census. For instance, in 2006 survey, we found there were 3,773 same rice households who participated in survey of 2004 (Table 6-1) then possibly to construct a panel for these two years. The 3-year panel construction was also possible with less number of repeated households. Due to there were only several same household left if link year of 2002 and 2008, it was unable to construct the 4-year panels.

[42] Note that that due to the change in using national Census from 1999 base to 2010 base, there was no connection between the household sample of 2010 and household sample of 2008 and before (the Census of 1999 is used for VHLSSs sampling from 2002 to 2008).

[43] See BUDDELMEYER, H., JENSEN, P. H., OGUZOGLU, U. & WEBSTER, E. 2008. Fixed Effects Bias in Panel Data Estimators. *The Institute for the Study of Labor (IZA) Discussion Paper No. 3487*. Bonn, Germany.

Table 6-1 provides detailed numbers of observations in each panel dataset used for the regression model. As shown, each of the four two-year panels and each of three-year panels contain approximately 4,000 and 1,600 rice-growing households respectively. On average, these were equivalent to about half of the households in each dataset involved in rice cultivation.

The provinces' trade values and GDP data were collected from provincial statistics yearbooks from 2002 to 2012. Provincial GDP data is set at the constant value of the 1995 price.

Table 6-1: Observations in panel datasets used in the analysis

Panel datasets	Number of observations	Number of rice-growing households	Percentage of rice households
2-wave panels			
2002-2004	3,931x2=7,862	4,455	56.67
2004-2006	3,773x2=7,546	4,237	56.15
2006-2008	3,935x2=7,870	4,193	49.14
2010-2012	3,975x2=7,950	3,820	48.05
3-wave panels			
2002-2004-2006	1,662x3=4,986	2,881	57.78
2004-2006-2008	1,571x3=4,713	2,657	56.38

Data regarding employment in export-oriented industries (EOIs) was extracted from VHLSSs database for both the household level (number of household members working in EOIs) and the commune level (total number of the commune's labour force working in the EOIs). To identify and classify whether exports exceeded imports within an industry the study uses the trade data with detail commodity code (6-digit HS 1996) obtained from the United Nations' COMTRADE database. These HS commodity codes were then matched with industry codes under ISIC rev.3 (used in the classification of industries in VHLSSs database). Based on data of exports and imports, the top 20 industries with export surplus were selected as the EOIs in each surveyed year. The inclusion of the number of local people working in EOIs at the commune level can be justified by recognising the spill-over effects of trade liberalization via the labour channel. Some socio-economic issues such as labour

migration, job movement, and farm-land conversion may follow the expansion of EOIs within a country under trade liberalization process (Başlevent and Onaran, 2004, Kneller and Pisu, 2007, Ozler, 2000, Athukorala and Menon, 1996). These issues have in turn affected directly or indirectly to agricultural activities in general and rice production in particular.

Table 6-2 provides brief definitions for the covariates and Table 6-3 shows the descriptive statistics of the variables used.

Table 6-2: Variables definition

No.	Variable code	Type	Definition
1.	MDI	Ordered rank	Multi-dimensional deprived index (MDI): Household's poverty status identified from the Latent Class Model (LCM) based on 10 manifest indicators. Assigned value of MPI = 1, 2, and 3 in accordance with "most deprived", "medium deprived", and "least deprived" respectively.
2.	HH-cat	Ordered rank	Household poverty status identified by comparing the Household income per capita per month with government's poverty line
3.	Rural	Dummy	= 1 if household is in rural area, = 0 if in urban area
4.	hhsize	Discrete	Total number of household's members
5.	wkmem_ratio	Continuous	Ratio of household members at working age, defined by age and gender: male: 18-60; female: 18-55
6.	remittance	Dummy	= 1 if household received remittance from ether domestic or oversea sources, = 0 otherwise
7.	hgrade9	Dummy	= 1 if head holds secondary school degree, = 0 if otherwise
8.	mtechdip	Discrete	Number of household members with a technical diploma
9.	minejob[44]	Dummy	= 1 if head has a job in the mining industry, = 0 if otherwise
10.	manfjob	Dummy	= 1 if head has a job in manufacturing sector, = 0 if otherwise
11.	servjob	Dummy	= 1 if head has a job in the service sector, = 0 if otherwise
12.	mem_minejob	Discrete	Number of household members with jobs in the mining industry

[44] Household's head non-farm jobs have been categorized into three groups which were based on accompanied survey questionnaire's classification of industries and sectors: (i) mining sector; (ii) manufacturing sector; and (iii) service sector.

No.	Variable code	Type	Definition
13.	mem_manfjob	Discrete	Number of household members with jobs in the manufacturing industries
14.	mem_servjob	Discrete	Number of household members with jobs in the services sector
15.	riceincome	Continuous	Income from rice production, defined by rice sale value minus rice production cost and any subsidies/supports from the Government
16.	nonrincome	Continuous	Income from all other sources
17.	ratio_TnTTvsTTn	Continuous	Ratio between Income from crops and Total household's income
18.	ricep_com	Continuous	Average rice price at commune level (can be understood as farm-gate price)
19.	ratio_ricedt_com	Continuous	Ratio of household's rice growing area in comparison to average rice area at commune level
20.	bca	Dummy	= 1 if household sold/bartered rice to private trader during the surveyed year; = 0 if otherwise
21.	ricevegan	Dummy	= 1 if household grew vegetables, annual industrial crops (maize, cassava, bean, etc.), and rice; = 0 if otherwise
22.	ricefrper	Dummy	= 1 if household grew fruit, perennial industrial crops (tea, coffee, rubber, etc.), and rice; = 0 if otherwise
23.	POI	Continuous	Provincial openness index (ratio of total exports plus imports to province's GDP, at constant price 2000).
24.	Expopen (EOI)	Continuous	Provincial export openness index, measured by Exports/GDP (provincial data)
25.	Impopen (IOI)	Continuous	Provincial import openness index, measured by Imports/GDP (provincial data)
26.	expjobt_com	Discrete	Total number of commune's labour force working in export-oriented industries
27.	expjob_total	Continuous	Total number of household members work in export-oriented industries
28.	RRD	Dummy	= 1 if household is in Red River Delta, = 0 if otherwise
29.	MRD	Dummy	= 1 if household is in Mekong River Delta, = 0 if otherwise

6.3 MODEL REGRESSION AND ANALYSIS

6.3.1 Latent class modelling (LCM) and measurement of multi-dimensional poverty

As is widely argued in the literature, poverty is a latent phenomenon with many dimensions. The status of poverty is often not directly observed but various aspect of welfare can be directly observed, for example, the level of consumption of differing goods and services. As the multidimensional poverty is latent, LCM appears to be a logical choice (Moisio, 2004) and has been used in previous empirical studies for Vietnam's data (Mahadevan and Hoang, 2016, Mahadevan and Hoang, 2015).

The main purpose of the LCM is to classify entire population of data into distinct classes characterised by the latent multidimensional poverty. By utilising data on the manifest indicators, LC model can be estimated to postulate the latent structure present in data (Hagenaars and McCutcheon, 2002). Following Vermunt and Magidson (2005), this study applies a single latent variable Xi (i.e. multi-dimensional poverty) with K classes/clusters and J observed manifest indicator. Let y_i denote the response of household, i on a set of manifest indicators (J). In order to capture various types of manifest indicators, such as nominal, ordinal, continuous, or count, the model for mixed mode data is used. The basic latent-class cluster model has the following form:

$$f(y_i) = \sum_{k=1}^{K} P(x_i = k) f(y_i | x_i = k) = \sum_{k=1}^{K} P(x_i = k) \prod_{j=1}^{J} f_k(y_{ij} | x_i = k) \qquad (1)$$

where $f(y_i)$ is the probability density of y_i given a specific latent class and $P(x_i = k)$ is the probability of belonging to a certain latent class.
The second part in the right hand side of equation (1) can be written in the log form as

$$\ln f(y_i | x_i = k) = \beta + \beta_x + \sum_{j=1}^{J} \beta_j^{y_i} + \sum_{j=1}^{J} \beta_j^{x,y_i} \qquad (2)$$

This formulation contains a constant term (β), which is standard in any regression equation, the main effects is the one-variable term for the latent variable (

β_x), the manifest indicators ($\sum_{j=1}^{J} \beta_j^{y_{ij}}$), and the two-variable terms involving the interaction terms of the latent variable x with each of the manifest indicators ($\sum_{j=1}^{J} \beta_j^{x,y_{ij}}$). The one-variable effects are included to avoid imposing constraints on the univariate marginal distributions (Magidson and Vermunt, 2002). This model can be estimated using the maximum likelihood method.45 The LCM analysis defines homogeneity in terms of probabilities in which households in the same latent class are similar to each other because their responses are generated by the same probability distribution using Bayes theorem. The households are then assigned to the class for which the posterior probability is highest.

In an ideal setting, manifest indicators of the multidimensional poverty in (1) should comprise three dimensions of poverty: health, education, and living standard (Alkire and Santos, 2014). However, data on nutrition, health and education is limited and/or not available in all the waves of the VHLSS. For example, self-assessment of food intake while used elsewhere but data on this variable is not available in all first four waves of the survey (from 2002 to 2008). Many other variables such as type of dwelling, whether the household paid rent or owned the dwelling, whether electricity was available, and the type of wall material are also excluded as their loading factors are smaller than 0.1. Table 6-3 provides descriptions of the ten indicators finally selected. The factor loadings- the higher values suggest a stronger relationship with the latent variable- are also reported in this table.[46]

Following (Mahadevan and Hoang, 2016), we impose three distinct ordered classes for the latent class model (1) mainly to reflect the important relevance for

[45] We use VERMUNT, J. K. & MAGIDSON, J. 2005. Latent GOLD® choice 4.0 user's manual. Statistical Innovations Inc., Belmont, MA.'s LATENT GOLD software. The estimation process starts with a number of expectations maximization iterations and when close enough to the final solution, the program switches to the Newton–Raphson algorithm. In this way, the software exploits the advantages of both algorithms, i.e. the stability of expectations maximization even when it is far from the optimum and the speed of the Newton–Raphson algorithm when it is close to the optimum. A limitation of the LATENT GOLD software is that it uses a specific fitting algorithm to allocate individuals/households across latent classes and in doing so, may not be trackable.

[46] As common in the literature of latent class modelling of multidimensional poverty, the choice of these ten manifest indicators is guided by considerations of data constraints, the values of factor loadings, and whether they have been used previously in the literature or not. These indicators are by no means exhaustive or complete.

policy analysis. The Vietnamese government has currently adopted new poverty classifications of three categories of 'poor', 'close-to-poor' (or vulnerable to being poor), and 'non-poor'. Table 6-4 shows the LG model's results for the three classifications of households.

Table 6-3: Indicators comprising the multidimensional deprivation index

	Indicators	Survey responses	Factor loadings					
			2002	2004	2006	2008	2010	2012
1	Own a washing machine	Yes or No	0.3917	0.7135	0.6754	0.5843	0.6306	0.7085
2	Own an air conditioner	Yes or No	0.2118	0.4219	0.411	0.3669	0.4946	0.6006
3	Own a landline	Yes or No	0.6247	0.7326	0.718	0.5833	0.4112	0.4104
4	Own a mobile phone	Yes or No	na	0.6095	0.6002	0.5737	0.4778	0.3939
5	Own a computer	Yes or No	0.2915	0.5711	0.547	0.471	0.5243	0.5881
6	Own an automobile	Yes or No	0.131	0.1415	0.142	0.1634	0.1551	0.1886
7	Own a motorbike	Yes or No	0.5765	0.4641	0.4582	0.5322	0.4553	0.3819
8	Type of toilet (*four levels with lowest level for the worst physical condition of the toilet*)	Flush toilet Pour flush toilet Double vault compost latrine Toilet directly over the water	0.7222	0.7534	0.7395	0.6618	0.6503	0.6932
9	Type of waste disposal (*four levels with lowest level for the worst service*)	Collected by someone Dumping in ponds and lakes Dumping in nearby site Landfill burial/burning	0.7376	0.6045	0.5824	0.6029	0.5146	0.5138
10	Source of drinking water (*six levels with lowest level for the worst physical condition*)	Tap in house Public tap Well Stream water Bought water Rain water	0.4993	0.5214	0.5116	0.5058	0.4687	0.4288

Note: Positive (negative) values means that the relationship between the latent variable and the indicator are positive (negative).

Table 6-4: Number of households classified in 3 clusters based on MPI (dependent variable) in panel datasets

mpi cluster#	Panel 2002-2004				Panel 2004-2006				Panel 2006-2008				Panel 2010-2012			
	2002	**2004**	Total	Percent	**2004**	**2006**	Total	Percent	**2006**	**2008**	Total	Percent	**2010**	**2012**	Total	Percent
Most deprived (1)	2,991	2,933	5,924	**75.35**	2,788	2,379	5,167	**68.47**	2,511	2,138	4,649	**59.07**	2,192	2,012	4,204	**52.89**
Medium deprived (2)	506	780	1,286	**16.36**	756	1,059	1,815	**24.05**	1,049	1,226	2,275	**28.91**	1,107	1,432	2,539	**31.94**
Least deprived (3)	434	218	652	**8.29**	229	335	564	**7.47**	375	571	946	**12.02**	675	531	1,206	**15.17**
Total	3,931	3,931	7,862	**100.00**	3,773	3,773	7,546	**100.00**	3,935	3,935	7,870	**100.00**	3,974	3,975	7,949	**100.00**

mpi cluster#	Panel 2002-2004-2006					Panel 2004-2006-2008				
	2002	**2004**	**2006**	Total	Percent	**2004**	**2006**	**2008**	Total	Percent
Most deprived (1)	1,287	1,261	1,100	3,648	**73.16**	1,173	982	820	2,975	**63.12**
Medium deprived (2)	201	322	439	962	**19.29**	303	456	541	1,300	**27.58**
Least deprived (3)	174	79	123	376	**7.54**	95	133	210	438	**9.29**
Total	1,662	1,662	1,662	4,986	**100.00**	1,571	1,571	1,571	4,713	**100.00**

In the conditional mixed process regression, the provincial openness indices (of exporting and importing aspects) were included in the rice income equation (2) and non-rice income equation (3) to first examine the impact of trade openness on these two factors before being transferred to household poverty status.

6.3.2 CMP regression results and discussion

6.3.2.1 Dependent variable is poverty status categorized by Multidimensional Deprived Index (MDI).

The determinants of multi-dimensional deprivation in this study were examined using a general framework consisting of different socio-economic variables including rice income and non-rice income and focussed on the two main rice-producing regions, RRD and MRD. Coefficients of the equations explain the impact on the probability of rice-growing households being deprived. The key group of variables in the model were trade-related variables, designed to capture the impacts of trade liberalization through two channels: employment and rice price. Table 6-5 and 6-6 presents the conditional mixed process regression results of two-year panels and three-year panels respectively. We report major findings in relations to various groups of variables in below sections. Overall, one consistent result is that rice-growing households have been less deprived over time. In general, the two transmission channels included in the model were rice price and employment, showing a number of significant impacts on the household's probability of experiencing poverty from 2002 to 2012.

Household characteristics and level of multidimensional deprivation

As expected, the results show household size and the ratio of working members in the household significantly reduced the probability of being deprived. These results were consistent over years of study from 2002 to 2012 by showing statistical significance in all two-year panels. The three-year panels show a similar sign to that of the household size variable's coefficient though insignificantly, and the ratio of working members was significantly consistent with the panel of 2004-2006-2008. As explained in the literature, it is likely that large-size households and households with more members of working age have a higher probability to upgrade their living

standard. These results are consistent with previous literature of Mahadevan and Hoang (2016).

As previous studies have shown the importance of education in improving household welfare in general, this study also shows that households with more people having vocational training or higher would have lower level of multidimensional deprivation. In terms of the impact of education on income, results from equations (3) and (4) show that those families with household head having a secondary school degree or higher appears to have higher rice and non-rice income. This result might be intuitionally understandable with the explanation of better capability of the household head in apply his education knowledge into practice of agricultural production (if he/she is farmer) or any other non-farm sector (if he/she work as salary earners). The results are in similar vein with previous literature which had primarily focused on general education on Vietnamese households' welfare and poverty such as (Litchfield and Justino, 2004) and (Justino et al., 2008, Niimi, 2007).

The study has also showed one characteristic that significantly impact on the multidimensional poverty status of rice-growing households: the ratio between household's income from crops and household's total income. Results in Table 6-6 present a negative association and consistently significant impact of this ratio on household level of being deprived. This means the higher this ratio, or the larger contribution of income from crops in total household's income, the higher possibility of that household being deprived.

Table 6-5: Conditional-mixed process regression results for two-year-window panels

	2002-2004			2004-2006			2006-2008			2010-2012		
	Coef.	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**
Multidimensional Deprived Index (MDI)												
Ratio of Crops Income vs Total Income of HH	-1.5718***	0.3268826	0	-1.4387***	0.2942347	0	-1.164127***	0.2188397	0	-0.8633095***	0.1762977	0
Household size	0.11009***	0.0350291	0.002	0.08023**	0.0330851	0.015	0.0654903**	0.0274777	0.017	0.0648164**	0.0264268	0.014
Ratio of working member in HH	0.487074**	0.2325414	0.036	0.40133**	0.1840713	0.029	0.3918821***	0.1462348	0.007	0.6385774***	0.1463507	0
Number of technical diplomas in HH	0.30045***	0.0857672	0	0.0794162	0.0640375	0.215	0.2726152***	0.0587452	0	0.1821329***	0.0646197	0.005
HH receives remittance	0.24784*	0.1396173	0.076	-0.1296151	0.1254684	0.302	0.125198	0.1174643	0.286	0.02926	0.1102211	0.791
Rice yield (commune average)	0.08908	0.0545268	0.102	-0.0469156	0.048453	0.333	0.0648522	0.0398735	0.104	0.1575422***	0.0400425	0
In Red River Delta	-0.12641	0.1033492	0.221	0.29083***	0.0907883	0.001	0.0728581	0.0808839	0.368	0.1942663**	0.0856457	0.023
In Mekong River Delta	-0.4743***	0.1539486	0.002	-0.1070642	0.1509592	0.478	-0.0217881	0.1191182	0.855	-0.0550302	0.1160476	0.635
Number of HH members working in EOIs	-0.20254***	0.0416863	0	-0.27395***	0.0415784	0	-0.1344863***	0.0339317	0	-0.0373636	0.0484828	0.441
Number of Commune's people working in EOIs	-0.0000131	0.0000683	0.848	0.0001224**	0.0000579	0.034	-0.0001148	0.0000725	0.113	0.0000906	0.0000726	0.212
Rice Income	0.000052***	0.000016	0.001	0.000052***	0.0000137	0	0.0000141**	6.09E-06	0.021	0.0000197***	5.71E-06	0.001
Non-rice Income	0.000024***	4.01E-06	0	0.000027***	4.41E-06	0	0.0000157***	3.06E-06	0	0.0000132***	1.82E-06	0
Year dummy	-0.510724***	0.0952534	0	0.31633***	0.0874847	0	0.4490612***	0.0705113	0	0.1161765	0.087713	0.185

	2002-2004			2004-2006			2006-2008			2010-2012		
	Coef.	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**
Rice Income												
If HH is in rural area	378.7732	359.4036	0.292	761.0035**	322.2012	0.018	948.5755	872.156	0.277	2217.622***	705.7917	0.002
Head has Secondary degree	231.0851	186.4387	0.215	62.41314	165.0693	0.705	463.7373	403.3128	0.25	192.8866	431.0463	0.655
Head works in mining sector	-1615.782*	870.1819	0.063	-1612.567*	956.708	0.092	-2297.337	2409.635	0.34	-1196.342	2269.661	0.598
Head works in manufacturing sector	-1171.065***	403.9988	0.004	-1177.138***	300.9634	0	-1980.405***	735.3845	0.007	-1185.736*	645.7445	0.066
Head works in service sector	-1041.286***	227.725	0	-1019.829***	200.2314	0	-1452.742***	483.615	0.003	-354.7324	487.4054	0.467
Rice price (commune average)	-1557.894***	403.3418	0	356.2992	364.228	0.328	2065.619***	648.3856	0.001	-1037.468*	558.7249	0.063
Ratio of HH's rice-growing land area vs commune's average	4488.709***	191.665	0	3952.599***	206.7912	0	5439.142***	491.8245	0	4529.816***	508.891	0
If HH sold rice to Private traders	1200.452***	190.7843	0	2788.55***	183.9295	0	2223.639***	433.0328	0	n/a		
If HH grows Rice + Vegetables + Annual industrial crops	-1622.488***	223.9272	0	-1360.823***	205.2347	0	-2780.53***	498.9502	0	-4366.923***	439.2438	0
If HH grows Rice + Fruit crops + Perennial industrial crops	-345.7003*	187.5456	0.065	-218.6685	170.7946	0.2	-751.9029*	413.9648	0.069	-472.826	406.9237	0.245
Provincial Export Openness Index	2858.319***	628.3815	0	1186.619***	448.3514	0.008	2117.746**	904.8212	0.019	1433.524**	665.2464	0.031
Provincial Import Openness Index	-1793.707***	458.5879	0	-773.1444**	304.1216	0.011	-1692.649**	691.3627	0.014	-1712.07***	397.8223	0
Intercept (constant)	2079.054***	785.6139	0.008	-1504.092**	737.4145	0.041	-4820.271***	1523.896	0.002	2522.765*	1508.478	0.094

	2002-2004			2004-2006			2006-2008			2010-2012		
	Coef.	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**
Non-rice Income												
If HH is in rural area	-1502.886**	695.6956	0.031	110.2955	998.3306	0.912	-1463.565	1125.661	0.194	-5540.415***	1965.711	0.005
Head has Secondary degree	2034.547***	352.2735	0	3295.651***	512.6532	0	2850.329***	529.4743	0	5382.347***	1171.549	0
Head works in mining sector	5898.949***	1871.501	0.002	7517.439**	3007.172	0.012	9305.947***	3174.253	0.003	-4412.191	6348.114	0.487
Head works in manufacturing sector	1808.873**	781.6276	0.021	1951.43**	948.8211	0.04	5139.137***	972.4363	0	-33.18046	1847.139	0.986
Head works in service sector	2505.894***	457.916	0	959.8821	649.5193	0.139	2924.649***	660.3147	0	-1179.234	1421.967	0.407
No. of HH members have skilled jobs	4136.47***	210.2042	0	4330.958***	271.7139	0	4499.239***	280.1584	0	8004.682***	509.552	0
No. of HH members have manual jobs	1672.602***	133.0147	0	1267.84***	204.8613	0	1660.554***	209.506	0	140.7064	515.3254	0.785
No. of HH members have other-type of jobs	4721.854***	1027.547	0	7735.338***	1350.771	0	5706.826***	1485.254	0	16745.53***	3363.533	0
Provincial Export Openness Index	6912.826***	1161.34	0	10775.17***	1329.633	0	6413.063***	1173.437	0	3058.889*	1859.452	0.1
Provincial Import Openness Index	-684.4719	878.7849	0.436	-1288.606	902.698	0.153	1904.752**	888.3843	0.032	634.5715	1094.507	0.562
Intercept (constant)	4506.197***	825.5889	0	5064.808***	1162.08	0	6102.613***	1290.446	0	14997.24***	2270.495	0
Number of observations	**3435**			**3264**			**3240**			**2031**		

Notes: n/a: not available. A positive coefficient implies that the independent variable reduces the probability of deprivation. Coefficient with (***) are significant at 1%; (**) significant at 5%; (*) significant at 10%.

Table 6-6: Conditional-mixed process regression results for three-year-window panels

	2002-2004-2006			2004-2006-2008		
	Coef.	Std. Err.	P>z	Coef.	Std. Err.	P>z
Multidimensional Deprived Index (MDI)						
Ratio of Crops Income vs Total Income of HH	-0.909178**	0.4666019	0.051	-1.4451***	0.3053478	0
Household size	0.0537038	0.0540063	0.32	0.0536822	0.0395118	0.174
Ratio of working member in HH	-0.1813094	0.2847617	0.524	0.55574***	0.2001569	0.005
Number of technical diplomas in HH	0.1722242	0.1093964	0.115	0.20203***	0.0748421	0.007
HH receives remittance	-0.1622464	0.2177007	0.456	0.2589284	0.1635401	0.113
Rice yield (commune average)	0.0423458	0.0765057	0.58	0.0086998	0.0535907	0.871
In Red River Delta	0.30679**	0.1531255	0.045	0.29892***	0.1062451	0.005
In Mekong River Delta	-0.1450211	0.2355896	0.538	-0.0987965	0.1678198	0.556
Number of HH members working in EOIs	-0.25120***	0.0729352	0.001	-0.1372***	0.0532561	0.01
Number of Commune's people working in EOIs	0.00022***	0.0000795	0.006	-0.00024**	0.0001047	0.025
Rice Income	0.0000341	0.0000222	0.124	0.0000101	8.69E-06	0.246
Non-rice Income	0.0000494***	8.91E-06	0	0.000014***	3.97E-06	0.001
Year dummy	0.486819***	0.1500807	0.001	0.47716***	0.0619548	0
Rice Income						
If HH is in rural area	1077.389**	430.1601	0.012	889.4769	1419.745	0.531
Head has Secondary degree	-78.86156	224.9788	0.726	734.1801	678.3882	0.279
Head works in mining sector	-2669.464**	1064.403	0.012	-2581.417	4636.793	0.578
Head works in manufacturing sector	-1746.211***	457.2823	0	-2057.28*	1149.987	0.074
Head works in service sector	-1314.607***	282.706	0	-1807.67**	796.0748	0.023
Rice price (commune average)	-2.167767	483.7993	0.996	2425.172**	1111.01	0.029
Ratio of HH's rice-growing land area vs commune's average	5109.48***	249.7179	0	6998.012***	833.5546	0
If HH sold rice to Private traders	1900.447***	230.6593	0	1377.459	731.5477	0.06
If HH grows Rice + Vegetables + Annual industrial crops	-2098.077***	287.4236	0	-3344.13***	836.1791	0
If HH grows Rice + Fruit crops + Perennial industrial crops	-485.066**	234.3881	0.038	-1076.812	690.9	0.119
Provincial Export Openness Index	2758.95***	681.9856	0	2830.245*	1568.328	0.071
Provincial Import Openness Index	-490.6988	487.1411	0.314	-2178.16**	1108.486	0.049
Intercept (constant)	-1557.295	983.1239	0.113	-6144.93**	2509.855	0.014
Non-rice Income						
If HH is in rural area	-572.0173	952.2334	0.548	962.0412	1448.269	0.507
Head has Secondary degree	3358.332***	484.3835	0	2908.42***	696.5659	0
Head works in mining sector	5902.209**	2440.505	0.016	7271.23	4835.131	0.133

	2002-2004-2006			2004-2006-2008		
	Coef.	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**
Head works in manufacturing sector	2223.975**	1035.363	0.032	3738.78***	1199.088	0.002
Head works in service sector	1062.173*	642.8601	0.098	1939.096**	865.3466	0.025
Number of HH members have skilled-type jobs	4864.505***	275.9168	0	3992.63***	356.1217	0
Number of HH members have manual-type jobs	1883.993***	186.2597	0	1102.51***	284.4786	0
Number of HH members have other-type of jobs	6493.519***	1342.896	0	6152.3***	1881.947	0.001
Provincial Export Openness Index	8525.574***	1419.237	0	10032.53***	1611.049	0
Provincial Import Openness Index	-1794.742*	1071.971	0.094	928.9451	1113.627	0.404
Intercept (constant)	3555.252***	1119.76	0.001	4832.02***	1665.801	0.004
Number of observations	**2310**			**1949**		

Notes: n/a: not available. A positive coefficient implies that the independent variable reduces the probability of deprivation. Coefficient with (***) are significant at 1%; (**) significant at 5%; (*) significant at 10%.

Communal, provincial, and regional variables

Land productivity at the communal level is found to have a positive impact on the level of deprivation over time in groups of two-years and three-years panels (except the first panel between 2002 and 2004). These positive results are consistent from previous studies of poverty dynamics in Vietnam. For instance, Justino et al. (2008) and Hoang (2012) found a similar positive impact of rice productivity on consumption growth and household welfare.

Regarding the regional dummies, the empirical results showed that during 2000s, rice farmers in Red River region have lower level of deprivation than those in those in North Central area. However, this result did not present for rice households in Mekong River region. The Red River region dummy showed positive effect and statistically significant in two out of four two-year panel (except the first panel of 2002-2004) and in all three-year panels. In contrast, results for Mekong River region were consistently negative in all panels included and was only statistically significant

in the panel of 2002-2004. However, the dummy of Red River region also presented negative impact in the panel of 2002-2004.[47]

More importantly, income from both rice and non-rice sources have positive association with the level of deprivation and these results are consistently statistically significant in all two-year panels. There is a difference presented with three-year panels where only non-rice income showing statistical significant correlation. The consistent results from two-year panels indicate that as rice and non-rice income increases, rice-growing households have a higher probability of being less deprived. This result is in line with findings from Hoang (2014) who found a significant link between MDI and income per capita using single wave of data for all households. Regarding the magnitude of those two income sources' coefficients, we can predict a quite small level of contribution of both rice and non-rice incomes on rice households' MDI status over time.

Impacts of trade liberalisation on multidimensional deprivation

The share of household members employed in export-oriented industries (EOI) is also included in order to capture the employment impacts of liberalisation.

The consistent negative association between deprivation level and the number of household's members with employment in export-oriented sector in most of two-year and three-year panels show contrast results with previous research of similar vent. Although a positive impact of trade liberalization via the employment channel on rice-growing households was expected, the regression result showed the reverse effect and was statistically significant in all panels except for 2010-2012. The results mean that having more family members working in export-oriented industries did not help to increase the probability of rice-growing household being less deprived. This negative relationship might be explained by the ineffectiveness of low skilled labour migration from farm activities to export-oriented sectors in Vietnam during the whole period of the 2000s. Rice-growing households' members migrated and worked

[47] During the period of 2002-2004 rice-growing households in these two regions were faced with a higher probability of being deprived because extremely adverse effects of continuing natural disasters such as drought and floods in these regions and also the spread of avian influenza epidemics. In particular, the Vietnam's government estimated that the avian influenza epidemics which began at the end of 2003 and lasted until to April 2004, reduced GDP growth by 0.5%. The RRD and MRD were the two regions with very large herds of poultry, and the epidemic therefore had a severe impact on the poverty reduction and elimination programs of those regions during that period.

in export-oriented industries with the expectation of reducing the risk of exposure to agricultural and economic shocks. However, a substantial share of individuals and households could not improve their living conditions due to a number of reasons, such as higher living costs, lack of knowledge and experience when living in modern cities, or limited access to affordable health care services (Nguyen et al., 2015, Le et al., 2011). In particular, the 2008 global economic crisis aggravated the vulnerability of migrants when a number stopped sending remittances or returned to their households at the place of origin (Oxfarm and VASS, 2009).

On the other hand, there were mixed results on the impact of total employment at commune level in the export-oriented industries on the household's poverty status. Empirical results show that this variable was positive and significant for the panel for 2004-2006; but negative (insignificant) in the panel for 2002-2004 and 2006-2008; and positive (insignificant) for the panels of 2010-2012. In three-year panels, they were both significant, but positive for the period from 2002-2004-2006 and negative for the period 2004-2006-2008. It could be argued that work in export-oriented industries is likely to drive up the probability of a household being less deprive, if these industries provide a higher income than the farming industry. However, empirical results in this study presented a quite small magnitude of this effect. In fact, it could be expected that the negative impact on the probability of a household being deprived might be explained by the surge of foreign direct investment (FDI) inflow into Vietnam beginning from the year 2006. In order to accommodate this second wave of FDI inflow[48], the government greatly increased land conversion for 'public purposes' opening up very large expanses of agricultural land in rural and peri-urban areas for this purpose (Phuc et al., 2014). It is estimated that nearly one million hectares of farmland were converted to non-agricultural uses between 2001 and 2010 (Davidsen et al., 2011). Most of this land area has been used for infrastructure projects such as roads, plants, or industrial zones in regions that are attractive for FDI capital such as the RRD and South East area. Moreover, an increasing number of people joining the industrial workforce in local or nearby plants/workshops might affect the availability of labour for agricultural production in

[48] The first wave happened at beginning of 1990s and reached a peak in 1996 then gradually slowed down as a result of Asian financial crisis until 2000 (see PHUC, N. Q., WESTEN, A. C. M. V. & ZOOMERS, A. 2014. Agricultural land for urban development: The process of land conversion in Central Vietnam. *Habitat International,* 41**,** 1-7.

general and rice production in particular. This trend could have resulted in the negative and statistically significant result of the variable in the three-year panel for 2004-2006-2008.

The impacts of trade liberalisation on rice and non-rice income

Four variables related to the impacts of trade liberalisation were included in our empirical models, namely the price of rice produce, the dummy of selling produce to private trade broker, import and export openness indexes. Empirical results found a consistent positive relationship between the price of rice (at the communal level) and the rice income of the household, which is consistent with our expectation. However, empirical evidence on the interactions between regional dummies and the rice price variables suggested that affected the household's rice income in the Mekong River Delta, but not in Red River Delta. One justification for this is that rice farmers in the MRD region enjoy more favourable prices. As mentioned in the previous chapter, the MRD accounts for more than half of rice production and up to 95% of Vietnam's annual rice exported volume (ISG-MARD, 2011), while rice production in the Red River Delta mostly serves domestic consumption purposes at household levels.

To capture the role of the private trader in the rice value chain, we include a dummy variable to ascertain whether rice-growing households sold their output through private traders during the year surveyed.[49] Results show that rice farmers who sold their produce through the private buyer appear to have higher level of rice income in all two-year panels as well as all three-year panels.

Results also show that provincial export openness index has a positive significant relationship with the non-rice income but not with the rice income. Import openness index is found to correlate positively with the rice income only in two-year panel from 2004 to 2006. Given the aggregate nature of these variables, we can also argue that there are some positive impacts of international trade liberalisation from national to provincial levels on the incomes of the rice farmers in Vietnam, which needs further research.

[49] In the VHLSS, farmers are asked "To whom did the rice farmer mostly sell or barter for the last 12 months?" The dummy is equal to unity if actually sold to private traders, otherwise (such as to SOEs, retail sales, etc.) is zero. This question was removed from the questionnaires of VHLSSs of 2010 and 2012, therefore it could not be examined for the corresponding panel dataset.

Other determinants of income

Regression results in Table 6-6 show that growing rice in rural or urban areas did not differ significantly in terms of rice income for households over time. However, a household's rice income is negatively correlated with the household head's level of education and occupations. These results could be simply because the household undertakes rice production as a secondary activity or for subsistence purposes. This argument is supported by further empirical evidence on two dummy variables capturing the crop diversification strategies. For those households that cultivate rice with other cash crops such as vegetables, fruits, or annual and perennial crops, their rice income is lower than those that only cultivated rice. Similar results are also reported for the land scale effects of rice growing in which empirical evidence shows that the larger the rice area households cultivated relative to commune's average level, the higher the possibility for the household to have a higher rice income.

In terms of the openness indices at the provincial level for the two-year panels, there were no statistically significant empirical results, except for the three-year panel for 2002-2004-2006, where import openness showed a positive significant impact at the 1% level. One possible explanation is that Vietnam's rice production inputs are heavily import dependence, for example some chemical fertilizers, herbicide and pesticide; and agricultural machinery or equipment. Therefore, the liberalization in agricultural policies relating to rice production in the periods studied, especially the simultaneous removal of rice-export quotas and fertilizer import restrictions in 2001, can be seen as factors contributing to the significant regression result. The sign reversal of the import openness index in the latter period between 2004-2006-2008 (combined with a similar negative sign of the index in the latter two-year panels for 2006-2008 and 2010-2012) presumably reflects the dominating impacts of exceptionally large increases in fertilizer prices due to sharply rising petroleum prices in this period, and which peaked in June 2008. The rise in oil prices in combination with other factors on both the supply-side and demand-side

were considered the main causes of the food price crisis that took place from September 2006 to June 2008.[50]

Factors affecting the households' non-rice income

Turning to the non-rice income equation, the regression has shown some noticeable results. Firstly, it is evident that households in rural areas have a lower probability of higher non-rice income compared to their urban counterparts. The dummy of "household is in a rural area" shows negative and statistically significant coefficients in two out of the four two-year panels, and although the results were not significant in three-year panels, they still had consistently negative signs. These results reflect the fact that non-rice income of Vietnamese households is mostly derived from off-farm income (which includes farm wages and migration earnings) in which migration earnings play an important source. Rice-growing households that live in urban areas usually enjoy more favourable economic development conditions; hence, they have more opportunities to earn better off-farm income.

Secondly, if the household head held a secondary degree and also had a job in any non-agricultural industries, there was a significant probability of having higher non-rice income in three out of four panels from 2002 to 2008, but a reversed impact was found for the period from 2010-2012. A household head working in mining, manufacturing, or servicing sectors had a higher probability of being less deprived than households whose head worked in the agricultural sector. A similar effect also presented with the number of household members' occupations identified based on skill level classification.

Thirdly, in contrast to results from the rice income equation, the variable "household grows rice, fruit, and perennial industrial crops" provided a positive effect and was statistically significant for two-year panels for 2002-2004 and 2006-2008. The dummy of "household grows rice, vegetables, and annual industrial crops" showed a similar negative impact as for the rice income equation. These results can be explained by the trade-off in land use between rice and other cash crops. Rice, vegetable crops, and most annual industrial crops have usually been grown in turns

[50] Details can be found in PHUNG, D. T. & WAIBEL, H. 2010. Food Price Crisis, Poverty and Welfare in Vietnam: An Ex-post Decomposition Analysis. Leibniz Universität Hannover, Institute of Development and Agricultural Economics, Germany..

on the same land area thereby creating an annual trade-off or competitiveness in land use. An increase in rice crops may lead to reverse impact on other cash crops within a year. Meanwhile, rice, fruits, and perennial industrial crops don't have the same trade-off in land use. One implication is that income and crop diversification both appear to have helped Vietnamese farmers to be less deprived.

Fourthly, the relationship of provincial openness with incomes (both rice and non-rice sources) is consistently over years. While the export openness index had a positive and statistically significant impact on increasing the probability of higher incomes (both rice and non-rice sources) in all used panels the import openness index shows a consistent negative effect in all periods between 2002 and 2012. Those results proved welfare, in general, and poverty status, in particular, of rice-growing households in Vietnam have been exposed evidently to the impact of trade openness. Export opportunities come along with trade liberalization process at provincial level might contribute to the higher possibility of welfare improvement while stresses from imports might have negative impact on household welfare and poverty.

6.3.2.2 Poverty status categorized by Household income per capita

Table 6-7 presents the conditional mixed process (CMP) regression results of two-year panels and Table 6-8 shows the three-year results. The CMP regression for the dependent variable of poverty status categorized by the household income per capita comparing with government poverty line in correspondent year provide a very similar picture (in terms of coefficient sign and degree of statistical significance) of impact on household poverty status with the case of multidimensional poverty index discussed in previous section. This similar result shows the robustness of the empirical model applied in assessing rice-growing household's welfare and poverty in Vietnam case. However, there are a few differences between the two results that we report as following. Firstly, the family size in this case has opposite impact on household poverty status. Results show that, household size has consistently reverse impact on the level of household being deprived in all panels. In this case, the large-size family might have less possibility of upgrading their living standard. This is true if in the family there are many dependent people such as children or old people who may require more financial expenditure rather than income contribution.

Secondly, in contrast to the first case of multidimensional deprivation index (MDI), the households in Mekong River region in this second case have showed lower level of deprivation than those in those in North Central area.

Thirdly, although effects of number of household members working in export-oriented industries (EOIs) and total employment of commune working in EOIs are still reverse correlation, they have not showed statistical significance as in the first case.

Table 6-7: CMP Regression results with 2-year panels and Poverty status classified by Income per capita

	2002-2004			2004-2006			2006-2008			2010-2012		
	Coef.	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**
HH_cat (poverty status based on HH Income per capita)												
Ratio of Crops Income vs Total Income of HH	-0.212374	0.5229352	0.685	-0.1493013	0.5535406	0.787	-0.4435746	0.6244663	0.478	-0.7044521	0.5324005	0.186
Household size	-2.7179***	0.2348232	0	-3.8728***	0.3875365	0	-2.7961***	0.2320476	0	-4.1093***	0.5360342	0
Ratio of working member in HH	0.3460321	0.4548072	0.447	0.7632*	0.414628	0.066	0.2858579	0.3352956	0.394	0.1327393	0.5330362	0.803
Number of technical diplomas in HH	-0.4174298	0.4009892	0.298	0.1283809	0.39208	0.743	1.4009***	0.4902183	0.004	0.7871306	0.635989	0.216
HH receives remittance	-0.43784*	0.2269505	0.054	0.0962101	0.275815	0.727	0.0029293	0.2745374	0.991	0.3000914	0.3895358	0.441
Rice yield (commune average)	0.1677*	0.0912403	0.066	-0.0183586	0.0937872	0.845	0.0738382	0.0993851	0.458	-0.0079944	0.140601	0.955
In Red River Delta	-0.3615*	0.1897237	0.057	0.2432426	0.2141769	0.256	0.2074732	0.209189	0.321	-0.118924	0.3315353	0.72
In Mekong River Delta	0.1868593	0.2633702	0.478	0.74834**	0.3514908	0.033	0.75623**	0.3795895	0.046	-0.3964489	0.4847556	0.413
Number of HH members working in EOIs	-0.0578408	0.0801884	0.471	-0.0491166	0.0871772	0.573	-0.0963392	0.0915346	0.293	-0.0746882	0.2597367	0.774
Number of Commune's people working in EOIs	0.0000923	0.0001827	0.614	-0.0002216	0.000146	0.129	-0.0000209	0.0001703	0.902	-0.0000401	0.0003887	0.918
Rice Income	0.00152***	0.0001404	0	0.00197***	0.0002066	0	0.00123***	0.0001277	0	0.00183***	0.0002509	0
Non-rice Income	0.00150***	0.0001289	0	0.00187***	0.0001874	0	0.00130***	0.0001047	0	0.00173***	0.0002239	0
Year dummy	-4.3433***	0.3789792	0	-1.7516***	0.2408461	0	-0.5322***	0.1915967	0.005	2.5721***	0.4750113	0
Rice Income												
If HH is in rural area	378.7622	358.6785	0.291	760.997**	322.3538	0.018	948.5705	871.1839	0.276	2217.62***	705.5641	0.002
Head has Secondary degree	231.0748	184.0535	0.209	62.40723	164.395	0.704	463.7352	399.7864	0.246	192.8838	432.332	0.655
Head works in mining sector	-1615.78*	865.3411	0.062	-1612.57*	956.2547	0.092	-2297.337	2404.618	0.339	-1196.342	2278.18	0.599

	2002-2004			2004-2006			2006-2008			2010-2012		
	Coef.	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**
Head works in manufacturing sector	-1171.06***	400.6964	0.003	-1177.14***	299.869	0	-1980.41***	734.5656	0.007	-1185.74*	647.8023	0.067
Head works in service sector	-1041.29***	225.8709	0	-1019.83***	199.9227	0	-1452.74***	483.6317	0.003	-354.7342	489.9283	0.469
Rice price (commune average)	-1557.91***	399.7469	0	356.2847	365.0347	0.329	2065.61***	650.8205	0.002	-1037.48*	559.9384	0.064
Ratio of HH's rice-growing land area vs commune's average	4488.7***	190.3536	0	3952.59***	206.3933	0	5439.14***	492.3621	0	4529.81***	511.0785	0
If HH sold rice to Private traders	1200.43***	188.3057	0	2788.55***	184.6928	0	2223.64***	433.6856	0	n/a		
If HH grows Rice + Vegetables + Annual industrial crops	-1622.5***	222.0882	0	-1360.83***	204.7212	0	-2780.54***	488.9401	0	-4366.93***	439.0963	0
If HH grows Rice + Fruit crops + Perennial ndustrial crops	-345.686*	186.0644	0.063	-218.6726	170.5352	0.2	-751.908*	415.3853	0.07	-472.8262	408.1601	0.247
Provincial Export Openness Index	2858.32***	622.1738	0	1186.62***	448.5214	0.008	2117.75**	905.7239	0.019	1433.52**	666.5188	0.031
Provincial Import Openness Index	-1793.7***	453.6651	0	-773.144**	302.875	0.011	-1692.65**	692.0121	0.014	-1712.07***	399.0053	0
Intercept (constant)	2079.04***	779.7041	0.008	-1504.098**	738.532	0.042	-4820.28***	1527.716	0.002	2522.76*	1511.563	0.095
Non-rice Income												
If HH is in rural area	-1502.89**	694.5272	0.03	110.2915	997.7023	0.912	-1463.561	1125.527	0.193	-5540.42***	1965.294	0.005
Head has Secondary degree	2034.55***	352.5528	0	3295.65***	512.5512	0	2850.33***	528.9161	0	5382.35***	1173.729	0
Head works in mining sector	5898.95***	1876.745	0.002	7517.44**	3009.952	0.013	9305.95***	3172.327	0.003	-4412.191	6349.849	0.487
Head works in manufacturing sector	1808.87**	784.2467	0.021	1951.43**	946.7654	0.039	5139.14***	972.0798	0	-33.18062	1846.298	0.986

	2002-2004			2004-2006			2006-2008			2010-2012		
	Coef.	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**
Head works in service sector	2505.89***	457.8683	0	959.882	649.8369	0.14	2924.7***	660.1005	0	-1179.235	1422.721	0.407
Number of HH members have skilled-type jobs	4136.47***	210.5563	0	4330.96***	271.8133	0	4499.24***	280.3903	0	8004.68***	510.6609	0
Number of HH members have manual-type jobs	1672.61***	132.8753	0	1267.83***	205.1172	0	1660.56***	209.2662	0	140.7057	513.9722	0.784
Number of HH members have other-type of jobs	4721.85***	1030.163	0	7735.34***	1354.114	0	5706.83***	1484.858	0	16745.53***	3366.667	0
Provincial Export Openness Index	6912.83***	1162.283	0	10775.2***	1331.854	0	6413.06***	1173.921	0	3058.89*	1859.214	0.1
Provincial Import Openness Index	-684.4721	879.7123	0.437	-1288.607	900.8513	0.153	1904.75***	890.9465	0.033	634.5713	1095.448	0.562
Intercept (constant)	4506.2***	824.5607	0	5064.8***	1161.681	0	6102.62***	1290.197	0	14997.24***	2271.484	0
Number of observations	**3435**			**3264**			**3240**			**2031**		

Note: n/a: not available. A positive coefficient implies that the independent variable reduces the probability of deprivation. Coefficient with (***) are significant at 1%; (**) significant at 5%; (*) significant at 10%.

Table 6-8: CMP Regression results with 2-year panels and Poverty status classified by Income per capita.

	2002-2004-2006			2004-2006-2008		
	Coef.	Std. Err.	P>z	Coef.	Std. Err.	P>z
HH_cat (poverty status based on HH Income per capita)						
Ratio of Crops Income vs Total Income of HH	-1.447402	1.012102	0.153	0.3696796	0.7728198	0.632
Household size	-4.025***	0.6041415	0	-3.5647***	0.5200175	0
Ratio of working member in HH	1.06463*	0.5895251	0.071	0.3418526	0.5420999	0.528
Number of technical diplomas in HH	0.6511177	1.088779	0.55	0.2047821	0.407131	0.615
HH receives remittance	-0.3448256	0.469164	0.462	0.2458063	0.3386944	0.468
Rice yield (commune average)	0.0515621	0.1412631	0.715	0.0212201	0.133478	0.874
In Red River Delta	0.4950676	0.3591982	0.168	-0.0040369	0.2792825	0.988
In Mekong River Delta	0.4400326	0.4931944	0.372	1.12135*	0.6037697	0.063
Number of HH members working in EOIs	-0.097534	0.1685848	0.563	-0.0551578	0.1192919	0.644
Number of Commune's people working in EOIs	-0.0003499	0.0002674	0.191	-0.000075	0.0001835	0.683
Rice Income	0.00209***	0.0003377	0	0.001725***	0.0002654	0
Non-rice Income	0.0019***	0.0002724	0	0.00172***	0.0002575	0
Year dummy	-2.1633***	0.4040793	0	-1.1478***	0.2501851	0
Rice Income						
If HH is in rural area	1077.39**	429.7225	0.012	889.4747	1415.161	0.53
Head has Secondary degree	-78.87195	224.5207	0.725	734.1764	670.6313	0.274
Head works in mining sector	-2669.47**	1061.887	0.012	-2581.417	4644.952	0.578
Head works in manufacturing sector	-1746.21***	455.861	0	-2057.28*	1148.573	0.073
Head works in service sector	-1314.61***	280.3889	0	-1807.66**	793.3389	0.023
Rice price (commune average)	-2.178452	483.2224	0.996	2425.17**	1109.931	0.029
Ratio of HH's rice-growing land area vs commune's average	5109.48***	249.1265	0	6998.01***	830.3928	0
If HH sold rice to Private traders	1900.44***	230.7434	0	1377.46*	728.3315	0.059
If HH grows Rice + Vegetables + Annual industrial crops	-2098.08***	286.9178	0	-3344.13***	810.888	0
If HH grows Rice + Fruit crops + Perennial ndustrial crops	-485.065**	233.7429	0.038	-1076.815	687.0255	0.117
Provincial Export Openness Index	2758.96***	681.7618	0	2830.25*	1566.851	0.071
Provincial Import Openness Index	-490.6978	486.0943	0.313	-2178.16*	1109.087	0.05
Intercept (constant)	-1557.298	981.3516	0.113	-6144.93**	2510.632	0.014
Non-rice Income						
If HH is in rural area	-572.019	949.2376	0.547	962.0344	1447.316	0.506
Head has Secondary degree	3358.33***	484.329	0	2908.42***	701.8145	0

	2002-2004-2006			2004-2006-2008		
	Coef.	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**
Head works in mining sector	5902.21**	2436.772	0.015	7271.23	4831.875	0.132
Head works in manufacturing sector	2223.98**	1035.248	0.032	3738.78***	1198.803	0.002
Head works in service sector	1062.17*	640.2751	0.097	1939.095**	865.3916	0.025
Number of HH members have skilled-type jobs	4864.5***	274.4139	0	3992.62***	355.1017	0
Number of HH members have manual-type jobs	1883.99***	186.0158	0	1102.49***	285.265	0
Number of HH members have other-type of jobs	6493.52***	1342.742	0	6152.3***	1878.115	0.001
Provincial Export Openness Index	8525.58***	1422.011	0	10032.53***	1609.995	0
Provincial Import Openness Index	-1794.742	1072.715	0.094	928.9446	1117.843	0.406
Intercept (constant)	3555.3***	1116.974	0.001	4832.014***	1663.426	0.004
Number of observations	**2310**			**1949**		

6.4 CONCLUSIONS

This chapter provided the results of an empirical study on the effects of trade liberalization on rice-growing households' welfare and poverty in Vietnam under the framework proposed by Winters (2002a). The outcome of trade liberalization on households' multidimensional poverty status was specifically investigated via three different mechanisms: (1) price channel, (2) employment channel, and (3) openness index, which was measured as a ratio of trade value (decomposed into two sub-indices of export and import openness) relative to GDP at the provincial level.

Using the maximum likelihood (ML) method to estimate the model and applying Stata's user-written command (**cmp**) of Roodman (2011) to deal with the issue of endogeneity, the study analysed six panel datasets constructed for rice-growing households from the Vietnam Household Living Standard Surveys (VHLSS) from 2002 to 2012. The empirical model yielded the following main findings:

(1) In general, employment opportunities in export-oriented industries (EOIs) for rice-growing household's members were not likely to improve their poverty status for the whole period from 2002 to 2012. The regression results showed that the more members of a rice-growing household with jobs in export-oriented industries, the more likely that household would be deprived. This might be due to the ineffectiveness of labour migration from farm activities to work in export-oriented sectors, given the lack of

sufficient skills or experience to accommodate a high living cost in modern cities where the EOIs are located. However, the spill effects of those employed in EOIs at the commune where the household was located had a positive effect on the likelihood of improving the household poverty status, although the magnitude of the effect was quite small over time.

(2) The effect of trade openness via the price channel showed a contrasted finding with previous literature of the same vein. Rice price at the commune level and economies of scale effect played an important role in increasing the rice income for households, and hence, improving the probability of that household becoming less deprived when considered from the multi-dimensional poverty aspect.

(3) The effect of economies of scope represented by the diversification in agricultural crops varied depending on the type of crops produced apart from the rice crop. The effect was positive for perennial crops and negative for annual crops, which were competitive in terms of land-use with rice production. This result raises the policy suggestion that expansion of non-rice agricultural cultivation specializing in perennial crops could contribute to poverty reduction and alleviation programs in Vietnam.

(4) The export openness index showed a significant and positive relation to non-rice income, but an insignificant impact to rice income.

(5) The important role of private traders/collectors was emphasized by a significant increase in the probability of the household being less deprived if rice-growing households' output was traded with them.

In summary, the contrast empirical results of the two channels in Winters' framework of trade liberalization impact on possibility of being deprivation of rice-growing households in Vietnam investigated in the chapter have brought a complementary insight of trade impact at household level. These results therefore provide an implication of policy differentiation in development policy design with regard to specific groups of agricultural households in a transitional developing country.

Chapter 7: Summary, Implications and Conclusions

7.1 INTRODUCTION

The research can be regarded as an integration of several literature streams: international trade, agricultural economics, industrial organization, value chain analysis, and farm household welfare. To solve the problems posed in the four main research questions, the dissertation conducted both qualitative (explorative) and quantitative (econometric regression) studies to examine the assumptions about the impacts of trade liberalization on household welfare using the data from the biennial surveys of VHLSSs from 2002 to 2012. The explorative study was undertaken to find the answer to the first and second research questions, and synthesize a theoretical framework of farm household's production that fits with various small farm household models in the context of developing countries like Vietnam. The empirical models were set up to obtain answers to the third and fourth research questions.

This chapter first summarizes the dissertation research in line with its aims and objectives in section 7.2. Following is the section 7.3 in which highlights both conceptual and empirical findings of this research. After discussing main policy implications and recommendations in section 7.4, section 7.5 point out drawbacks and limitations of the study and identifying directions for future research respectively. The last section 7.6 is for the concluding remarks.

7.2 SUMMARY OF THE STUDY

Vietnam's rice sector was selected for both value chain analysis and empirical study due to the important role that rice plays at both macro- and micro-economic levels. At the macroeconomic level, rice is an agricultural product contributing significantly to annual export turnover, in addition to playing an essential role in assuring national food security. At the micro-economic level, rice is the major staple food, accounting, on average, for about 75% of the daily caloric intake in Vietnamese diets. Furthermore, rice production is also the main source of income for many rural households, representing 44% to 51% of total household income (UNEP,

2005). Farm household welfare was considered under consumption and multi-dimensional poverty aspects and provides complementary analyses for the explorative and value chain studies.

In addition to the **Chapter 1** of Introduction and **Chapter 7** of Summary, Implications and Conclusions, this dissertation consists of other five chapters.

Chapter 2 provided an overview picture of Vietnamese economic and agricultural development in the process of trade liberalization. In this context, rice, a main staple of the economy, is also highlighted as an important component in the country's export-oriented agriculture. It was recognised that rice production is exposed to both risks and benefits from trade integration. Discussion in the chapter also emphasized Vietnam's policy trilemma of compromising among three targets of rice production: (i) domestic food security; (ii) exports; and (iii) farmers' income. This political and structure constraint has made the rice sector secures an essential position in agricultural development policy setting in Vietnam.

Chapter 3 reviewed the literature on the topics set out in the proposed research questions. The theoretical links among trade liberalization and welfare proposed in this review section underline the role of the transmissions channels that operate within markets structures and economic institutions. Such channels exist between a macroeconomic policy (trade policy), and the microeconomic setting of prices, factor of productions, and strategies of the farm households facing trade policy reforms. All of these are shown to be important determinants of the households' welfare status. One major conclusion from the literature review is that the trade liberalization impact has been transmitted to households' welfare mainly via two means. The first is through households' sources of income, such as wages, employment, and sales of agricultural products. The second is via the cost of their consumption bundle and expenditure. It is also shown that while there have been several investigations into the questions raised in this dissertation, the methods used have limited sensitivity.

Chapter 4 built up a contextual framework and methodological foundation of the dissertation. A farm household model based on theories and Vietnamese rice sector characteristics has been synthesized to illustrate possibilities of farm operation and responses under trade liberalization impact. The transmission mechanism and linkage between trade liberalization with farmer's welfare were established to prove that the assumption of complete pass-through impact might not true and the three

price influences (local, national and global prices) need not coincide and a representative farm household would make decisions in anticipation of the existence of these three influences.

Chapter 5 was devoted to analysing value chain influences to identify reasons for the disadvantage position of Vietnamese rice farmers in gaining trade liberalization benefits. The chapter helped to identify the reasons for incomplete pass-through of trade liberalization impact Vietnam's rice value chain. Due to many intermediaries participating along the chain and also the policy and infrastructure constraints, the benefits of the past remarkable increase in rice export volumes and prices have not accrued to the farmers who actually grow the rice.

Chapters 6 provided an in-depth empirical investigation of trade liberalization impact on welfare and poverty of rice-growing households in Vietnam. By replacing the conventional poverty measure with a derivation of the multi-dimensional poverty index, the chapter shows that rice income contributed to the *possibility* of Vietnamese households being less deprived. However, this possibility has not been well realized to date.

Technically, the econometric technique applied to deal with the issue of endogeneity in seemingly unrelated equations (SUR) provides evidence of how the trade liberalization impacts transmit to households' welfare and poverty. Specifically, the export openness index at the provincial level is shown to have a significant impact on non-rice income leading to raising the likelihood that these farm household will be less deprived. The price channel played an important role in improving household's income, both from rice and non-rice sources. In contrast, the trade liberalization impacts via the employment channel have not shown a higher possibility of being less deprived to rice household. The relative sizes of two channels, the balance struck between them, and any effective redistributive measures are critical elements of impacts.

This last chapter, **Chapter 7**, first summarizes the main findings and contributions of the research then discusses policy implications and recommendations. The chapter also pointed out the dissertation study's limitations, future research suggestions before provides overall conclusions.

7.3 MAIN FINDINGS AND RESEARCH QUESTION DISCUSSIONS

This dissertation was developed to examine the central research issue of the nature of the impact of trade liberalization on farm households' welfare. In this context its aim is to make an important contribution to the literature by seeking to answer four specific questions:

1. How might the opening of an economy and trade liberalization affect different sectors?
2. What are the sectoral and sub-sectoral welfare impacts of trade liberalization on Vietnam's agriculture in general, and the rice sector in particular?
3. How are the welfare effects of trade liberalization distributed across stakeholders, particularly farm households, in Vietnam's agriculture?
4. What are some implications for public policy in Vietnam?

7.3.1 Research question 1

RQ1 was principally explored in Chapters 4 and 5 which two chapters provide a conceptual framework for setting up regression model as well as interpretation of empirical study in Chapter 6.

There are four main findings from the Chapter 4's schema development and Chapter 5's value chain analysis applied to Vietnam's rice sector:

- *Firstly*, *the essential role of intermediary actors in rice value chain*. The farm household framework setup and value chain analysis have shown that the way in which intermediary actors conduct their activities along the rice value chain do matter in explaining how trade liberalization's welfare impact is distributed among them and rice farmers. The dissertation found an incomplete pass-through in terms of price along the Vietnam rice value chain, especially in the rice export chain. The strong presence of the network of private traders (collectors) in the paddy rice procurement activity emphasizes not only their indispensable roles in the chain but also the fragmentation in Vietnam's rice production process. This finding reflects the important and indispensable roles of intermediaries in filtering the transmission effect of price changes from border to farm gate price in Vietnam's rice sector. It is

due to the number of intermediaries involved, that gains from trade liberalization have not accrued to the rice growers as expected but to other actors along the chain. Among these intermediary actors, this dissertation shows the dominating position of SOEs in the chain in terms of their market power and influence on government policies.

- *Secondly*, *the weak bargaining power of rice farmers/households.* This study reveals that Vietnam's rice value chain is characterized by a typically "buyer-driven" chain in which downstream actors have dominant and controlling roles. In fact, Vietnam's rice-growing households have little market bargaining power compared to other actors along the chain, particularly food companies and exporters who are mostly SOEs. This position has led rice farmers becoming vulnerable and more exposed to external risks particularly when market condition change. However, the presence of asymmetrically distributed returns does not principally stem from the value chain structure itself, but rather, from the interaction among the participating actors who influence the chain performance in terms of price pass-through.
- *Thirdly, the ineffectiveness of government policies in rice.* The rice value chain analysis reveals institutional issues in the marketing system of Vietnam's rice sector. While a number of government policies are targeted to improve farmer welfare, many do not achieve their goal due to inappropriate design and lack of monitoring and enforcement mechanisms. The ineffectiveness of government policy may also reflect insufficient openness in Vietnam's rice sectors because of the importance of national food security. The rice market structure and the way value chain participants' conduct their activities are likely to introduce "imperfections" into the chain and allow for a variety of opportunistic conduct (by, for example, rice exporting SOEs or private traders/collectors) that may constrain transmission of greater returns to farm households.
- *Fourthly,* the study also shows evidences of *inadequate agricultural infrastructure in the rice sector.* Given that the Vietnamese rice sector is dominated by small-scale households, inadequate infrastructure (for example the storage system, transportation facilities) combined with ineffective provision of agricultural extension services and market asymmetrical access to information is a feature which is present along the rice supply chain. This

is a key factor which hinders rice-growing households from realizing the benefits from trade liberalization. The question can therefore be posed that given the existing infrastructure – including the financial system for agricultural support from the government and farmers' access to vocational training and education – is there sufficient and sufficiently efficient information to ensure a high level of pass-through of price variation to farmers in Vietnam? The question requires a more detailed and comprehensive analysis of rice value chain in Vietnam.

7.3.2 Research question 2 and 3

Results from the value chain and explorative analysis also took into account the empirical studies used to identify determinants of rice households' welfare under trade liberalization during the period of the 2000s in Vietnam. These provide responses to **RQ2** and **RQ3**. In particular, the empirical regression in Chapter 6 provided the following important findings:

- *The trade openness index* at the provincial level is shown to have a significant effect on rice-growing households' welfare and poverty during the studied period. Specifically, the export openness index contributed positively to the rice households' welfare improvement, while the import openness index had both positive and negative effects on rice farmers' wealth and poverty depending on the period. Moreover, the regression result from the SUR model in Chapter 6 show that the trade openness impact transmitted through non-rice income affects the poverty condition of Vietnamese rice households.
- The finding of a negative impact of the *proportion of household's members working in the export-oriented industries* on rice household's welfare and poverty reveals the ineffective participation of rice-household members in non-farm activities.
- A positive and significant relationship between a *commune's average rice price* and welfare improvement. This result is supported by the finding of a positive and significant relationship between selling rice to private traders and higher rice-income in Chapter 6's model. However, rice price in this study is considered as a farm-gate or producer price. Due to non-availability of price data at each node along the rice value chain, further research is

therefore required to investigate in more detail how price impact transmission from the border (export price) to the farmers (farm-gate price), affects rice-growing households' welfare and poverty.

- Another important finding was the presence of *economies of scope effect* within rice-growing households. Chapter 6 provided evidence of the direction of agricultural diversification apart from earnings from rice cultivation. That is, the combination of fruits and other industrial perennial crops can improve non-rice income, and therefore, contribute to overall household welfare.

Additionally, the crucial role of human capital contribution to the welfare improvement of rice households in Vietnam should be mentioned. Regression results from both Chapters 6 shows a robust positive impact which the technical diploma ratio has on rice household's individual member welfare. As such it is strong evidence of human capital enhancement through vocational training and education.

On the other hand, quantile regression in Chapter 6 illustrates the uniform impact of trade openness between the poorest and richest household quintiles in terms of real per capita consumption expenditure. Moreover, regression results indicate no clear difference in the pattern of impact between households along the distribution.

Overall, the findings from both the explorative value chain analysis and empirical studies of this dissertation allow an examination of trade liberalization's impact via channels of employment and price changes. Employment and prices significantly affected the household's welfare; in opposite directions however, and were not markedly different between the richest and poorest household groups along the quintile distribution of real consumption expenditure per capita.

7.3.3 Research question 4: Policy implications

There is a range of policy implications that can be derived from the explorative and empirical findings of this dissertation. *Firstly*, the research has highlighted the way in which the value chain impacts generate important trade policy issues in relation to welfare analysis at the microeconomic level. Thus the inclusion of value chain analysis provides key insights of how the trade liberalization effect transmits to various agricultural stakeholders in the rice sector. Standard economic analysis of trade liberalization research generally assumes a perfect open market in which any

trade induced variation of price is fully transmitted between actors in a supply chain. However, this study shows evidence of intermediaries who alter the transmission effect of trade liberalization on farm household welfare. Therefore, using value chain analysis as a tool for agricultural development policy design, issuance and implementation would clearly improve policy effectiveness. Specifically, with Vietnam rice sector, policy makers should take into account the important role of collectors on pass-through effect along the chain in articulating the impact on rice household welfare.

Secondly, in both the explorative and empirical chapters, regional heterogeneity is observed. This reflects trade liberalization's impact on household welfare and poverty and the resulting variation between regions. Hence, the regional differentiation should be taken into account in any policy making process regarding the Vietnam's agricultural development in general and in rice production and trade in particular.

This study also reveals the essential need to have development policy and poverty reduction closely linked with welfare improvements for Vietnamese rice farmers. In other words, a development policy should take into account regional differences in rice production in Vietnam. Given the MRD and part of the RRD regions where rice farmers generally have access to better conditions for rice production (larger land area, better infrastructure, more advanced in mechanization, marketing system, etc.), policies should promote a more market oriented approach to rice production. Where rice farmers are not in the commercially targeted areas of the MRD and parts of the RRD, rice production policies need to be accompanied by other government social welfare and poverty support policies, including complementary measures to mitigate adverse effects of trade liberalization. Specifically, these compensatory policies should target groups of ethnic minorities and those residing in mountainous and remote areas that are primarily rice self-sufficient households but are indirectly impacted by the trade liberalization process.

Thirdly, in dealing with rice sector constraints (as analysed in Chapter 2) that are preventing rice-farmers from gaining higher income and better welfare from trade liberalization, policy decision makers should take into consideration the advantages and demonstrated achievements of the current pilot implementation of the Large-Scale Field Model (LSFM) in rice production. This model might fit as a

comprehensive solution for addressing the identified constraints both in production and marketing aspects of Vietnam's rice sector. The government should continue to support and encourage the multiplication of the model, especially in the RRD and MRD regions. In doing so the LSFM can firstly help to solve the issue of small-scale and fragmented cultivation which hinders rice-growing households in achieving economies of scale. Secondly, it creates close horizontal linkages among rice-growing households for a series of collective actions in rice production (which includes the improvement in bargaining power of farmers in supply chain), along with vertical linkage between farm households and enterprises who are rice distributors to both domestic and international markets. In this way a means for achieving production efficiencies in terms of input and marketing costs is created. The formation and implementation of LSFM can also create close backward and forward linkages with input and output markets with a contract-based connection between farm households and enterprises. However, similar to the above-mentioned second implication, the multiplication of LSFM has to take into account also the issue of regional difference in all concerning aspects of rice production (such as land, production inputs, regional infrastructure, employment, etc.)

Fourthly, in recognition of institutional ineffectiveness in the rice sector as analysed in Chapters 2 and 5, the dissertation indicates the necessity of a sectoral restructuring in terms of market structure and conduct of parties within the rice value chain, especially the participation of private exporters. This restructure can be seen as an essential component in the national project of restructuring Vietnam's agriculture currently underway. The role of the government in general and SOEs in particular in the rice sector should be revisited and redefined. In the process fundamental reforms could be considered to restructure the allocation mechanism of G2G rice contracts.

In addition, the ambiguous functional role of the VFA needs to be addressed. The VFA should be a professional and independent association rather than an extended policy arm for state interventions. The price stabilizing role – a traditional role of government agencies – should be returned to the government's ministries from the VFA and its SOEs members to avoid double-role playing in the rice sector of VFA.

Regarding the empirical studies, the findings of Chapter 6 indicate the important need for a pro-farmer infrastructure system which improves Vietnamese farm households in general and rice-growing households in particular. There are two particularly important policy directions that are suggested in this regard. The first is related to the issue of human capital development for rice-growing households. There is potential for rice households to diversify their income sources and in this way raise their welfare in the long term. To do so however there is a demonstrated need of government support for education and vocational training programs. Moreover, access to new technology and knowledge through training and education systems will allow rice household members to enhance their employment skills enabling them to adapt and be more flexible regarding changes away from non-farm job markets in case of agriculture labour reduction or redundancy.

The second policy direction recommended relates to the finding of the economies of scope impact on non-rice income which is outlined and analyzed in Chapter 6. There is a demonstrated need for rice households to diversify their agricultural activities in the direction of investing in fruits and perennial industrial crops, instead of annual crops.

7.4 LIMITATIONS AND FUTURE RESEARCH SUGGESTIONS

The objective of this study is to examine the effects of trade liberalization on farm household welfare. In order to achieve this research objective, the dissertation integrates different literature streams, including international trade theory, value chain analysis, welfare economics literature, and a farm household model into a conceptual framework. By trying to build up a typical farm household model that reflects farm household activities in a small open economy, this dissertation may not have synthesized all the relevant assumptions and insight provided by these literature streams. To cover the full diversity of various literature streams, a broader framework may be appropriate.

This dissertation contains an empirical model using average rice prices at the commune level to measure the impact of price changes on households' welfare. This requires an assumption that households are producing a homogenous commodity, whereas there could in fact be quality differences. Moreover, as pointed out by Seshan (2014), households can respond to price variations not only by changing

production and input choices for a particular quality or variety of rice, but also by altering the quality or variety of the rice produced. This would imply that changes in average prices at the commune level will not accurately reflect the price variations faced by individual households. Unfortunately, the VHLSS dataset does not provide information on the varieties of rice produced by farmers.

Another limitation of this study relates to the data availability and data collection. Further research is warranted which uses a survey method to obtain more complete and specific data which better serves the rice value chain analysis. Dependence on secondary and sometimes not up-to-date data may have led to the missing of a dynamic change process under the trade liberalization context.

Moreover, constraints of scope limited this dissertation to the use of a single indicator of consumption expenditure per capita as a measure of household welfare. Indeed in most empirical studies, income has been used as the only indicator for household welfare and resources (Wagle, 2007). A more specific picture of the impact of trade liberalization on household welfare could be obtained by using a more comprehensive indicator to capture the means by which households can achieve their wellbeing. In this respect sources of income would offer a better picture of how a given household will be affected by trade liberalization compared to the pattern of expenditure. Thus while expenditure patterns are likely to have greater similarity among households with similar total expenditures, income sources provide a better differentiating factor (Isik-Dikmelik, 2006, Van de Walle and Cratty, 2004).

A further extension to the scope of research could be achieved by additional empirical analyses which provide a more diversified perspective of trade liberalization induced impacts on household welfare. Such extensions could include rice farmer technical efficiency, non-farm activities, poverty dynamics, and inequality of rice-producing households. Furthermore, use of the updated panel data set from VHLSS 2012 and 2014 would clearly provide further support of this dissertation's findings.

Use could be made of more comprehensive indicator of household welfare. Applying the full concept of multi-dimensional poverty would be a possible direction to further investigate the impact of trade liberalization on rice-growing household welfare in Vietnam for example. As well, a comparative study using the rice value chain analysis of several other countries (for example, Thailand, India, and

Australia), would provide useful comparisons on which to assess the relative performance of Vietnam's rice value chain and potential alternative arrangements.

With regards to the policy perspective, an extensive application of Structure – Conduct – Performance (SCP) model and industrial organization theories can be considered as a possible further study direction. Vietnam's rice sector and value chain can be mapped in terms of the components of the "SCP template" (market/chain structure, firm/household conduct, technology and performance). Select (changes to) components and likely impacts can be explored within a consistent framework. Government policy choices (such as monitor, intervene, control or no action) can be assessed with respect to expected market/sector/firm performance effects, and performance can be considered in terms of commercial returns, welfare, poverty, balance of payments contribution and the like.

7.5 CONCLUSIONS

There has been a long and continuing interest in investigating the economic impact of trade liberalization on agriculture in developing countries. This research is an attempt to contribute to the current literature on the welfare impact of trade liberalization in Vietnam. Both explorative and empirical studies in this dissertation have provided useful information for policy making processes, and for understanding agricultural development in Vietnam. Value chain analysis has demonstrated that Vietnam's rice sector requires more appropriate policies to achieve potential benefits from trade liberalization with regard to farmers' welfare and poverty. Incomplete pass-through effect of price is evident in Vietnam's rice value chain due to intermediary factors that filtering the transmission of trade liberalization impact. Rice sector analysis has also provided evidence for policy makers to identify how the government could (choose to) regulate (and how) in achieving welfare increase for rice farmer under trade liberalization.

For the rice households, the issue is how they adapt to market changes, both domestically and internationally. Factors such as access to skill training or diversification opportunities, understanding of practically realisable economies of scale and scope effects, and appreciation of market and chain influences can help improve household welfare and reduce poverty.

High among the important policy implications drawn from the research findings is the need for regional differentiation in agricultural policy approaches and implementation. Vietnam's rice sector is an example of differentiated regional exposure to external shocks under the trade liberalization effect. Given that Vietnam is a leading agricultural exporter, empirical studies under a similar framework to this research could be extended to other key agricultural products, and in this way assist policy makers to develop a more comprehensive approach to dealing with poverty, welfare and agricultural development in Vietnam, and beyond.

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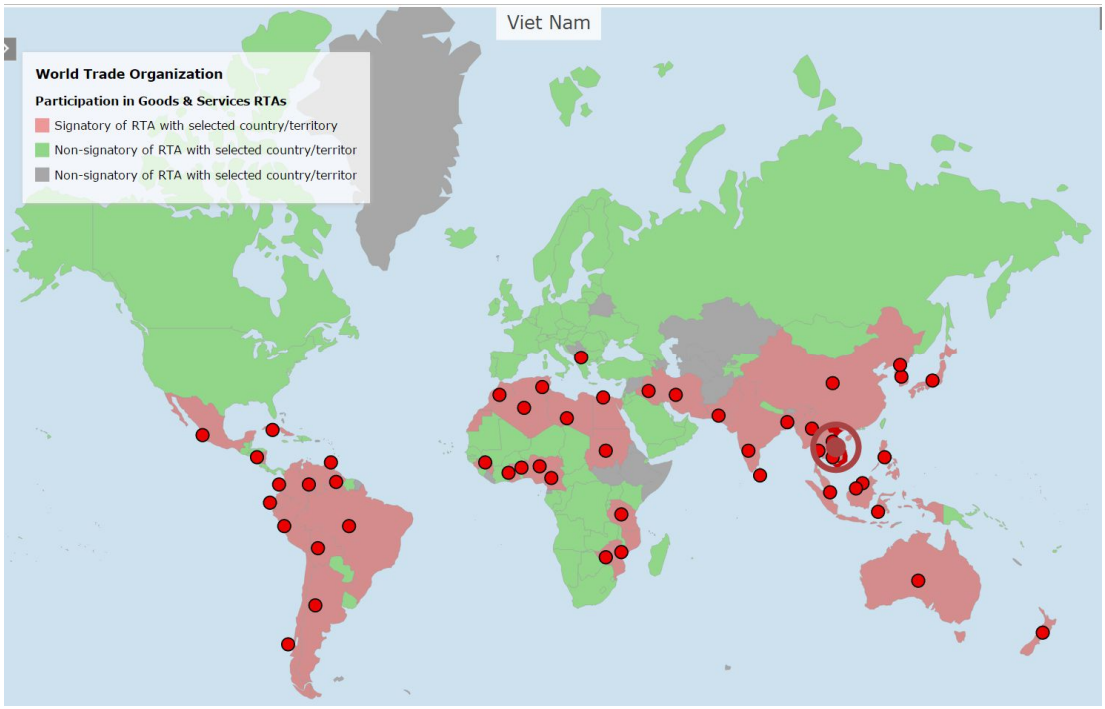
Appendices

Appendix 1: Map of Vietnam's regional trade agreement (RTAs) notified to WTO



Source: WTO's websites; retrieved on Oct 15, 2015.

Notes: WTO statistics on RTAs are based on notification requirements rather than on the physical number of RTAs. Thus, for an RTA that includes both goods and services, two notifications are counted (one for goods and the other services), even though it is physically one RTA.

Appendix 2: Planted area, production, and yield of paddy by region (1995-2013)

	Indicators	1995	%	2000	%	2005	%	2010	%	2013	%
Whole country	Planted area	6,765.6	100	7,666.3	100	7,329.2	100	7,489.4	100	7,899.4	100
	Output	24,963.7	100	32,529.5	100	35,832.9	100	39,988.4	100	44,076.1	100
	Yield	3.69		4.24		4.89		5.34		5.58	
RRD	Planted area	1,193	17.6	1,212.6	15.8	1,186.1	16.2	1,150.1	15.4	1,130.7	14.3
	Output	5,090.4	20.4	6,762.6	20.8	6,398.4	17.9	6,803.2	17	6,698	15.2
	Yield	4.44		5.43		5.39		5.92		5.92	
NMMA	Planted area	656.8	9.7	687.1	9	661.2	9	666.4	8.9	688.8	8.7
	Output	1,786.5	7.2	2,292.6	7	2,864.6	8	3,081	7.7	3,275.8	7.4
	Yield	2.61		3.48		4.33		4.64		4.76	
NCCA	Planted area	1,104.7	16.3	1,117.5	14.6	1,144.5	15.6	1,214.1	16.2	1,230.2	15.6
	Output	3,555.8	14.2	4,972.8	15.3	5,342.5	14.9	6,154	15.4	6,600.7	15
	Yield	3.25		4.02		4.67		5.07		5.37	
CH	Planted area	173.2	2.6	176.8	2.3	192.2	2.6	217.8	2.9	231.5	2.9
	Output	429.5	1.7	586.8	1.8	717.3	2	1,047.3	2.6	1,162.8	2.6
	Yield	2.44		3.32		3.73		4.82		5.02	
SE	Planted area	447.3	6.6	526.5	6.9	318.9	4.4	295.1	3.9	280.3	3.5
	Output	1,269.8	5.1	1,212	3.7	1,211.6	3.4	1,333.2	3.3	1,345.8	3.1
	Yield	2.83		3.19		3.8		4.49		48	
MRD	Planted area	3,190.6	47.2	3,945.8	51.5	3,826.3	52.2	3,945.9	52.7	4,337.9	54.9
	Output	12,831.7	51.4	16,702.7	51.3	19,298.5	53.9	21,569.7	53.9	24,993	56.7
	Yield	4.02		4.23		5.04		5.43		5.7.6	

Unit: planted area (1000 ha); output (1000 tons); yield (tons/ha)

Source: GSO's Statistical Yearbooks 2000, 2005, 2010, and 2013

Appendix 3: Viet Nam's Rice (milled equivalent) balance sheets from 1990 - 2011

Year	Domestic supply					Domestic utilization						Per capita supply				Total population
	1000 Metric tons											Total		Prot.	Fat	
	Prod.	Imp.	Stock var.	Exp.	Total	Food	Food manuf.	Feed	Seed	Waste	Oth. uses	*Kg / Yr*	*KCal / Day*	*Gr / Day*	*Gr / Day*	
2011	28,280	2.0	-103	7,355	20,824	13,066	357	2,526	848	2,602	1,425	145.3	1,397	28.5	4.6	89,914
2010	26,684	1.0	465	7,128	20,022	12,948	264	2,388	801	2,478	1,144	145.4	1,398	28.5	4.6	89,047
2009	25,980	1.0	414	6,172	20,222	12,768	415	2,544	779	2,398	1,319	144.8	1,392	28.4	4.6	88,200
2008	25,833	1.0	-724	4,897	20,213	12,731	386	2,456	775	2,364	1,501	145.7	1,401	28.6	4.6	87,369
2007	23,974	2.0	-207	4,713	19,056	12,473	393	2,282	719	2,194	995	144.1	1,386	28.3	4.6	86,553
2006	23,912	1.0	-310	4,800	18,802	12,287	329	2,288	717	2,188	992	143.3	1,378	28.1	4.6	85,748
2005	23,901	-	517	5,429	18,989	12,645	274	2,098	717	2,225	1,030	148.9	1,432	29.2	4.7	84,948
2004	24,111	-	-672	4,202	19,238	13,024	184	2,076	723	2,218	1,013	154.8	1,488	30.3	4.9	84,151
2003	23,057	2.0	-414	3,943	18,703	12,953	168	1,777	692	2,133	980	155.4	1,495	30.5	4.9	83,353
2002	22,976	41.0	-1138	3,351	18,529	12,815	142	1,776	689	2,127	979	155.2	1,493	30.4	4.9	82,548
2001	21,416	3.0	-534	3,857	17,029	12,412	123	1,302	642	1,995	555	151.9	1,461	29.8	4.8	81,729
2000	21,697	-	-334	3,596	17,768	12,084	147	2,385	651	1,970	531	149.4	1,437	29.3	4.8	80,888
1995	16,651	11.0	-505	2,009	14,148	10,345	41	1,140	500	1,549	573	136.1	1,339	27.3	4.4	76,020
1990	12,823	2.0	490	1,593	11,722	9,195	99	186	385	1,249	608	133.4	1,353	27.6	4.5	68,910

Source: FAO Statistics (URL: http://faostat3.fao.org/download/FB/*/index.html)

Appendix 4: Summary of characteristics and functions of actors in Vietnam's rice value chain

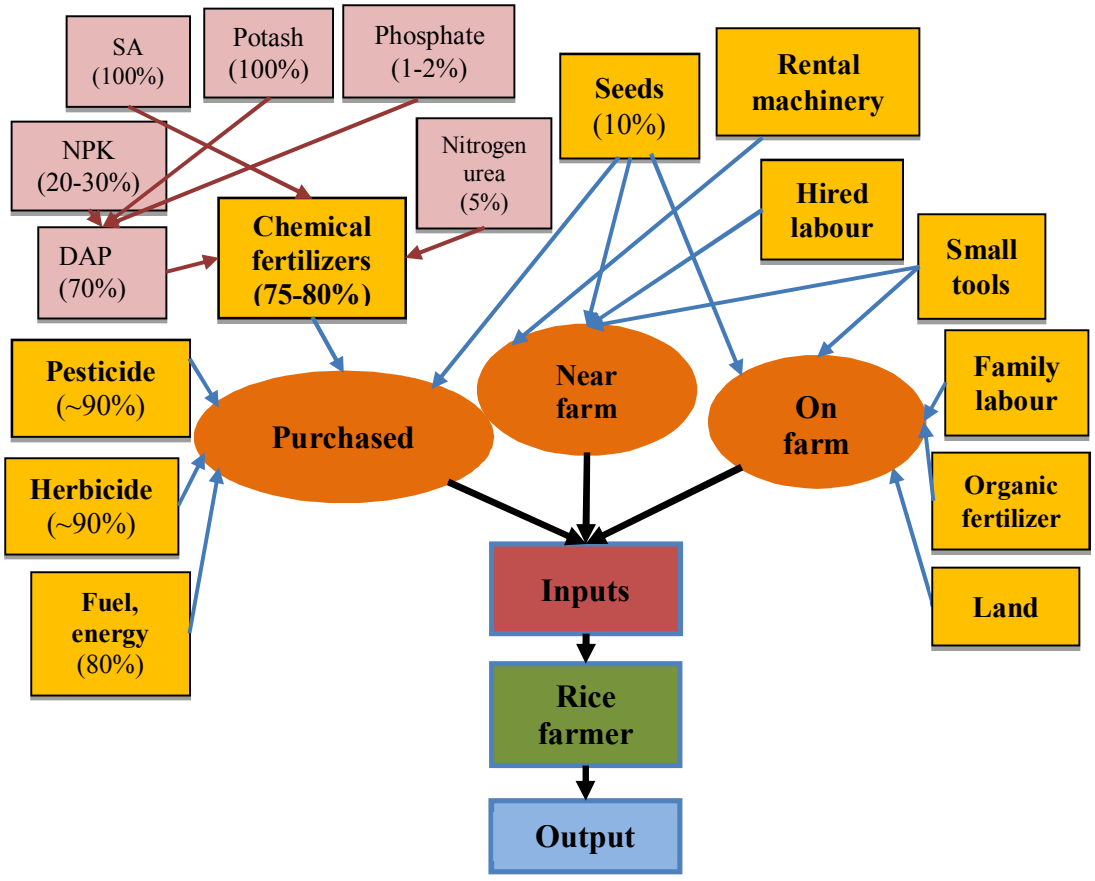
Actor	Summary			
	Characteristics	**Costs**	**Margins**	**Constraints**
Farmers	Activity: paddy production	- Production costs (input costs) all costs including rental and family labour included here		- Land use, seed improvement - Raising costs of purchased fertilizer and pesticide, irrigation, research and extension, credit availability.
Collectors	- Small private companies or individuals operating on small margins - Activity: buy paddy from farmers then transport to millers. Sometimes provide drying, husking or storage services before selling to millers, food companies or exporter, or wholesalers/retailers.	- Paddy purchase cost - Transportation costs (fuel) - Labour cost for load/unload rice - Husking cost to get brown rice (if any).	On average, 2.9% and 1.6% of retail price for the MRD and RRD respectively (IFPRI, 1996)	- Credit and price constraints - Asymmetric Information
Millers	- Activity: paddy purchase, then husk and mill to brown rice or raw white rice. - 3 types of millers: + Specialized milling operations (pure millers): procure paddy from assembler/farmers + Specialized polishing operations (polishers) procure brown rice to polish for export purpose. + Integrated milling and polishing operations (miller-polishers)	- Paddy/brown rice purchase cost. - Other operation costs.	- Net profit of about 9% but the margin is buttressed by sales of by-products, notably bran and broken rice.	- Constraints in quality control of brown rice bought from collectors/assemblers. - Credit constraints - Limit of storage capacity - Limit in marketing

Actor	Summary			
	Characteristics	**Costs**	**Margins**	**Constraints**
Food companies/ exporters	- Most of exporters are SOEs - Activity: buy rice from millers or direct from farmers to processing for exports. - Most of rice export is based on G2G contracts, which are usually signed a long time before physical delivery. Thus, price risk associated with international price fluctuations is absorbed entirely by the exporters/food companies.	Cost: rice purchases (mainly) + other costs Constraints: ability to purchase pure high rice quality and varieties, capital, infrastructure (storage and transportation) and marketing	- Margins for SOE exporters are relatively low: net profit of 1-2US$ per ton (ACI, 2002)	- Marketing system prevents adequate quality control and standardization in rice varieties for exports. - Private exporters cannot compete with SOEs due to most of the exports occurring under G2G contracts. - Quality of rice for exports. - Lack of information about international markets, long-term marketing strategy,

Source: Author comprised from Tran et al. (2013), ACI (2002) and IFPRI (1996).

Appendix 5: Inputs of rice production in Vietnam

This schema was constructed based on the VHLSS data on rice production in Vietnam to illustrate the source of supply and dependency on imported goods of some inputs. In this schema, rice production inputs have been categorized into nine groups in which chemical fertilizers further decompose into different specific types. Percentage numbers show the proportion of imports over the average annual total required volume. Those numbers were collected and also calculated by author from statistics and reports of Vietnamese government's ministries and department (named GSO, MOIT, and General Department of Customs).



Appendix 6: Statistical descriptions of panel datasets used in Chapter 6

Variable	2002-2004					2004-2006				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
mdi	7862	1.329433	0.6219462	1	3	7546	1.390008	0.6224438	1	3
hh_cat	7862	2.778046	0.5607357	1	3	7546	2.743838	0.6054577	1	3
rural	7862	0.7783007	0.4154163	0	1	7546	0.7627882	0.4254014	0	1
RRD	7862	0.2027474	0.4020714	0	1	7546	0.2181288	0.4130027	0	1
MRD	7862	0.2213177	0.4151603	0	1	7546	0.2091174	0.4067053	0	1
hhsize	7862	4.457136	1.73704	1	20	7546	4.312218	1.707521	1	20
wkmem_ratio	7862	0.517741	0.2314466	0	1	7546	0.5728825	0.2632723	0	1
mem_skilljob	7721	0.6201269	0.9252385	0	6	7363	0.7453484	0.9825652	0	9
mem_manjob	7721	2.121616	1.408008	0	10	7363	2.1551	1.340895	0	11
mem_otherjob	7721	0.0358762	0.194171	0	2	7363	0.0467201	0.2223361	0	2
expjob1_tot	7721	1.870742	1.458093	0	10	7363	1.799402	1.421242	0	10
hgrade9	7862	0.435131	0.4958057	0	1	7546	0.4664723	0.4989077	0	1
minejob	6775	0.0070849	0.0838792	0	1	6529	0.0068923	0.0827398	0	1
manfjob	6775	0.0764576	0.2657484	0	1	6529	0.0945015	0.2925475	0	1
servjob	6775	0.3067159	0.4611644	0	1	6529	0.3190381	0.4661396	0	1
mtechdip	7542	0.1943781	0.5166684	0	4	6941	0.2910243	0.6338359	0	5
remittance	7862	0.8494022	0.3576792	0	1	7546	0.8856348	0.3182754	0	1
ricep_com	5187	1.754579	0.2601503	0.9291871	3.053958	4237	1.859977	0.246116	1.135266	2.910061
ricepdty_com	5187	4.56589	1.096916	0.06	10.26203	4237	4.732414	1.111059	0.32	9
ratio_ricedt_com	4455	1.002224	0.4343178	0.0699708	6.217617	4237	0.99549	0.3778217	0.0777202	2.623588
bca	3449	0.5494346	0.4976224	0	1	4237	0.2874675	0.4526349	0	1
ricevegan	7862	0.4425083	0.4967153	0	1	7546	0.4309568	0.4952429	0	1
ricefrper	7862	0.3616128	0.480498	0	1	7546	0.3646965	0.4813769	0	1
riceincome	4452	3269.31	4151.585	-9407.476	62118.84	4231	3389.775	5101.608	-2392.136	142964.7
nonrincome	4452	12456.99	10485.3	22.00187	213874.5	4231	15009.46	13058.64	-219.6859	223817.2

Variable	2002-2004					2004-2006				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
ratio_TnTT~n	7861	0.2570948	0.2661267	-0.8429574	1.948357	7546	0.2303097	0.2490401	-0.2035928	1.038367
expjobt_com	2382	242.1872	626.8258	0	8414	2558	267.5786	590.7514	1	8414
yeart	7862	1.5	0.5000318	1	2	7546	1.5	0.5000331	1	2
expopen	5685	0.2897648	0.3571115	0.0117206	1.925532	5428	0.3683869	0.4951431	0.004959	3.494708
impopen	5685	0.2739543	0.467851	0.0012828	2.052949	5428	0.3663933	0.5611169	0.0013131	2.961736

Variable	2006-2008					2010-2012				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
mdi	7870	1.529479	0.6997141	1	3	7949	1.622846	0.733765	1	3
hh_cat	7870	2.768615	0.582025	1	3	7950	2.824277	0.5109832	1	3
rural	7870	0.758831	0.4278198	0	1	7950	0.7406289	0.4383171	0	1
RRD	7870	0.2160102	0.4115474	0	1	7950	0.1932075	0.3948392	0	1
MRD	7870	0.1997459	0.3998347	0	1	7950	0.2	0.4000252	0	1
hhsize	7870	4.238755	1.669183	1	15	7950	4.008931	1.57739	1	15
wkmem_ratio	7870	0.6365922	0.2769098	0	1	7950	0.5620116	0.2710052	0	1
mem_skilljob	7662	0.7911772	0.9833414	0	6	7672	1.258081	1.135633	0	9
mem_manjob	7662	2.045027	1.34143	0	11	7672	0.9247914	1.115048	0	8
mem_otherjob	7662	0.0421561	0.2213578	0	3	7672	0.0374088	0.1991586	0	3
expjob1_tot	7662	1.75137	1.392605	0	9	7672	0.4131908	0.7686486	0	6
hgrade9	7870	0.4731893	0.4993124	0	1	7690	0.4924577	0.4999756	0	1
minejob	6836	0.0086308	0.092507	0	1	6821	0.0073303	0.0853091	0	1
manfjob	6836	0.0983031	0.2977458	0	1	6821	0.1215364	0.3267736	0	1
servjob	6836	0.3238736	0.4679867	0	1	6821	0.3615306	0.480479	0	1
mtechdip	7304	0.2905257	0.6344339	0	5	7858	0.2907865	0.6210586	0	4
remittance	7870	0.880432	0.3244763	0	1	7950	0.8525786	0.3545478	0	1

Variable	2006-2008					2010-2012				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
ricep_com	4193	2.043599	0.3342828	0.9578682	3.703629	4964	2.420674	0.4685384	1.162207	5.166171
ricepdty_com	4193	4.864847	1.099458	0.32	12	4964	4.96728	1.216126	0.8888889	12.5
ratio_ricedt_com	4193	1.002479	0.3876066	0.0290745	2.658228	3820	1.007286	0.395471	0.025641	2.78453
bca	4193	0.2997854	0.4582185	0	1	n/a				
ricevegan	7870	0.4012706	0.4901867	0	1	7950	0.3383648	0.4731831	0	1
ricefrper	7870	0.3259212	0.4687478	0	1	7950	0.2573585	0.4372061	0	1
riceincome	4193	4050.598	10431.5	-10998.6	465119.3	3820	3221.198	8715.372	-69494.24	117391.3
nonrincome	4193	16854.16	14937.35	-24562.5	263009.9	3820	22066.45	20291.77	-2594.322	285281.3
ratio_TnTT~n	7870	0.2283756	0.2560501	-0.0294367	1.40625	7950	0.2044668	0.2613944	-0.0208773	2.188889
expjobt_com	2692	263.7221	501.8464	1	5155	2376	193.3338	476.7785	0	6070
yeart	7870	1.5	0.5000318	1	2	7950	1.5	0.5000314	1	2
expopen	5602	0.4062354	0.4816179	0.004959	3.494708	3020	0.4995843	0.3978823	0.070743	1.850637
impopen	5602	0.3920842	0.5591735	0.0013131	2.961736	3020	0.6138357	0.6232046	0.0119123	2.329157

Variable	2002-2004-2006					2004-2006-2008				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
mpi	4986	1.343763	0.6135859	1	3	4713	1.461702	0.6591618	1	3
hh_cat	4986	2.772964	0.5702409	1	3	4713	2.757904	0.5890138	1	3
rural	4986	0.7831929	0.4121114	0	1	4713	0.7769998	0.4163026	0	1
RRD	4986	0.1907341	0.3929193	0	1	4713	0.2196053	0.4140232	0	1
MRD	4986	0.2154031	0.4111429	0	1	4713	0.1909612	0.3931002	0	1
hhsize	4986	4.429803	1.748129	1	20	4713	4.287078	1.643309	1	15
wkmem_ratio	4986	0.5618351	0.2523663	0	1	4713	0.5959975	0.2704629	0	1

Variable	2002-2004-2006					2004-2006-2008				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
mem_skilljob	4896	0.661969	0.9600348	0	6	4600	0.795	0.9831904	0	6
mem_manjob	4896	2.176062	1.376012	0	10	4600	2.105	1.316948	0	11
mem_otherjob	4896	0.0398284	0.2047612	0	2	4600	0.0408696	0.2076576	0	2
expjob1_tot	3253	2.110974	1.425361	0	10	4600	2.044348	1.367863	0	9
hgrade9	4986	0.4354192	0.4958615	0	1	4713	0.4844048	0.4998098	0	1
minejob	4376	0.0084552	0.0915731	0	1	4059	0.0054201	0.0734303	0	1
manfjob	4376	0.0772395	0.2670016	0	1	4059	0.102981	0.3039715	0	1
servjob	4376	0.297989	0.4574269	0	1	4059	0.3195368	0.4663546	0	1
mtechdip	4717	0.2304431	0.5733901	0	5	4386	0.2879617	0.6192106	0	5
remittance	4986	0.8768552	0.3286363	0	1	4713	0.8888182	0.3143905	0	1
ricep_com	3184	1.804878	0.2620788	1.150459	3.053958	2657	1.95688	0.3308524	0.9578682	3.703629
ricepdty_com	3184	4.658151	1.074569	0.8136364	8.533334	2657	4.793431	1.100995	0.32	8.766846
ratio_ricedt_com	2881	1.001413	0.4230912	0.0699708	6.217617	2657	0.993003	0.3776536	0.0290745	2.590755
bca	2436	0.4646962	0.4988545	0	1	2657	0.2762514	0.4472268	0	1
ricevegan	4986	0.456077	0.498117	0	1	4713	0.4298748	0.4951106	0	1
ricefrper	4986	0.3850782	0.4866626	0	1	4713	0.3524295	0.4777775	0	1
riceincome	2881	3430.275	4699.106	-9407.476	69446.06	2657	3716.573	11596.86	-2392.136	465119.3
nonrincome	2881	13791.68	11433.6	92.00782	113874.9	2657	16247.01	14336.26	-24562.5	263009.9
ratio_TnTT~n	4986	0.2589323	0.2650558	-0.8429574	1.310836	4713	0.2312181	0.2497534	-0.171274	1.026321
expjobt_com	1554	246.6042	609.7834	0	8414	1635	277.252	576.9724	1	8414
yeart	4986	2	0.8165785	1	3	4713	2	0.8165832	1	3
expopen	4000	0.3157203	0.4344597	0.004959	3.494708	3014	0.3841358	0.4710049	0.004959	3.494708
impopen	4000	0.2760892	0.4902076	0.0012828	2.961736	3014	0.4015092	0.5610275	0.0013131	2.961736

Note: n/a: data not available