



Česká Zemědělská Univerzita

Faculty of Economics and Management

2012 – 2015

Bachelor Thesis

**Economic evaluation of coffee
commodity and coffee production in
Vietnam**

by

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Declaration

I do solemnly declare that this bachelor thesis titled “Economic evaluation of coffee commodity and coffee production in Vietnam” was carried out on my own without undue help from a second person others and without using such tools other than that specified.

In Prague,

Nam Anh TRAN

Acknowledgement

I would like to express my special thanks of gratitude to my supervisor Ing. Petr Procházka, MSc, PhD, who has given me the golden opportunity to accomplish the Bachelor Thesis on the topic: “Economic evaluation of coffee commodity and coffee production in Vietnam”. He, who always had an extremely creative way of conveying ideas, impressed me by his deeply profound knowledge. He, who always worked relentlessly for the devotion to education, inspired me to become a better man. If it is possible, I would be honored to be under his guidance in higher level of education, once again.

**Economic evaluation of coffee commodity and coffee
production in Vietnam**

**Ekonomické vyhodnocení kávy komoditních a
výrobě kávy ve Vietnamu**

Summary

Although coffee is perceived as one of the world's most preferred drink, not everyone has a true and complete understanding of it. Many people know that Brazil is the biggest exporter of coffee at the moment, but have no idea that the second place has been belonging to Vietnam for 15 years straight. When it comes to Robusta production, Vietnam even surpasses Brazil to claim its first place. So why do people still be unfamiliar with this fact? Another interesting point is that, the history of Vietnam coffee industry was quite faint, and that Vietnamese coffee just stood out on world coffee markets for less than 20 years. Then what kind of events occurred during the 1990s that gave Vietnam coffee industry an incredible boost to achieve the current titles? These are just a few of numerous interesting facts about coffee represented in this work. The author hopes that, through the work, the readers will be able to know more about one of the most traded commodity in the world, as well as Vietnam under the eyes of coffee lovers.

Key words

Coffee, coffee commodity, coffee production, Vietnam, economics

Souhrn

I když káva je vnímán jako jeden z nejvíce preferované pití na celém světě, ne každý má pravdivé a úplné pochopení toho. Mnoho lidí ví, že Brazílie je největším vývozcem kávy v současné době, ale netuší, že druhé místo bylo patřící Vietnamu už plynulý 15 let. Pokud se jedná o výrobu robusta, Vietnam dokonce předkročí Brazílii nároku první místo. Tak proč jsou lidé stále neznámý s touto skutečností? Dalším zajímavým bodem je to, že historie Vietnamský kávový průmyslu byl dost slabý, a že vietnamská káva právě vystupovala na světových trzích kávy za méně než 20 let. A jaký druh akcí došlo v průběhu roku 1990, které daly Vietnamský kávový průmysl neuvěřitelný stimul pro dosažení aktuální tituly? To jsou jen některé z mnoha zajímavých faktů o kávě zastoupené v této práci. Autor doufá, že díky práci budou čtenáři moci dozvědět více o jednom z nejvíce obchodované komodity ve světě, ale i Vietnamu pod očima milovníků kávy.

Klíčová slova

Káva, káva komodita, výroba káva, Vietnam, ekonomika

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Dependent variable: Production

Model 2: OLS, using observations 1988-2005 (T = 18)

Dependent variable: Production

Chapter I – Introduction

Coffee is one of the highest traded commodities which frequently appear on worldwide top markets such as New York and London. In spite of relatively humble global annual quantity supplied, coffee has been bringing work and fortune to millions of farmers in coffee exporting countries. More specifically, during the last few years, annual world production of coffee was estimated to be around only 8 – 9 million tonnes, which was far inferior comparing with that of other agricultural commodities, such as sugar cane (1.9 billion tonnes), pumpkins (1.1 billion tonnes), maize (1 billion tonnes) or even rice (740 million tonnes) (*FAO, 2015*). What made coffee become so popular was indeed its extraordinary high demand. New era required people to work harder, longer and smarter. They had less time to rest and instead, had to work late more often. Sleepiness is a permanent visitor, who usually comes with tiredness and exhaustion, negatively affect brain's working performance. Naturally, coffee has become human's best friend.

There is no doubt that many people all over the world begin their day with coffee. Some drink for pleasure, some drink as a habit and some need it in order to remain alert during their working hours. Various researchers have claimed that coffee does boost one's working performance dramatically thanks to its caffeine chemical, whose effects are known as increasing adrenaline production and blocking sleep-inducing chemicals in the brain, hence, reducing sleepiness. Coffee also increases blood circulation, helping deliver oxygen to brains, thus increasing concentration. In fact, 2.25 billion cups of coffee are consumed everyday throughout the world, enough to confirm the indispensable important role of coffee in our daily lives (*"The 'Latte Revolution'?" Ponte, Stefano 2002*).

There are many interesting things about coffee. Everyone should have known how coffee powder looks like, but not everyone knows that the initial color of coffee seeds were green (not even mentioning the cherry – colored coffee fruits). Everyone should have been able to distinguish between roasted coffee and instant coffee, but not everyone knows how it was made. Anyone who loves drinking coffee may have been familiar with several world famous coffee trademarks such as Folgers, Maxwell House, Nestlé, Starbucks, Jacob, José Café, Trung Nguyen, etc. However, they are only (primarily) manufacturers who imported coffee from plenty of producers all over the world, mainly from Brazil and Vietnam. When it comes to Robusta coffee, Vietnam is the leading producer (since 41% market share belonged to Vietnam) (*Department of Agriculture and Rural Development, 2014*). In order to understand this special commodity as well as its function in world market, one should first understand the coffee industry in Vietnam.

Chapter II – Goals and Methodology

The purpose of this work is to provide the readers a better understanding of Vietnam as one of the biggest coffee producers in the world. Throughout the paper, the readers shall know more about the distribution of coffee plantation in Vietnam, how coffee are cultivated, harvested, processed and manufactured. Moreover, Vietnam's position on global markets as a coffee producer, an exporter shall be represented through multiple comparisons. In addition, a relation between the production, productivity and plantation area of Vietnamese Robusta coffee shall be analyzed, using Ordinary Least Squared method. Finally, the strengths and weaknesses of Vietnam coffee industry will be mentioned.

In personal viewpoint, the author believes that if one is able to perceive and master the natural operating rules of coffee markets, based on observation of market's movements, not only he or she would have a deep insight of the market trends, but also the ability to make forecast, thus, being well-prepared for any incoming risks as well as future opportunities. In short, the author hopes that through the work, the picture of Vietnam coffee industry shall be clearly depicted.

The work was carried out based on theory synthesis and data analysis. The information and data was derived from a variety of trustworthy sources which have close connections or involve in coffee business. In Literature Review section, the information was a synthesis, extraction, deduction and induction of a diversity of general knowledge, local farmer's experience and official governmental sources. In Analysis section, the figures were primarily derived from FAO, ICO, GSO and DARD, then fundamentally analyzed and sketched by using Excel and Gretl. Personal review and commentary was made in both sections and in each paragraph.

Chapter III – Literature Review

3.1 History of coffee

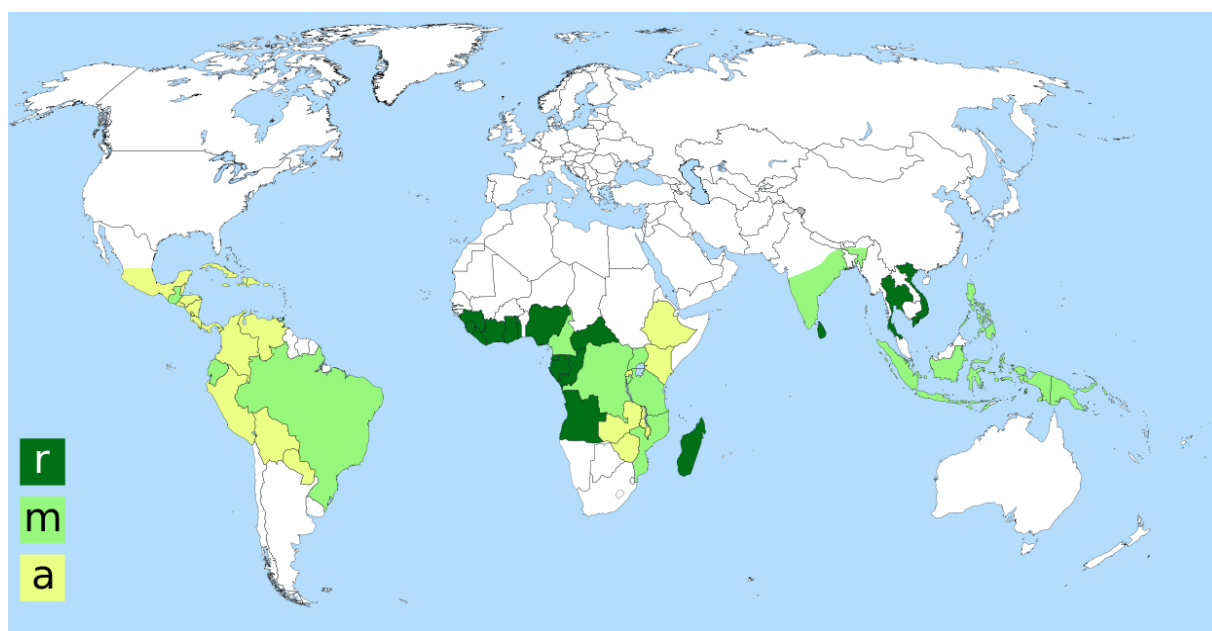
There are many stories about the origin of coffee, but it seems like only the story about a goatherd named Kaldi of Abyssinia was the most trustworthy of all. It began between 900 and 1000 A.D. in Abyssinia, where there was a young goatherd known as Kaldi. One day, while herding his goats as usual, he surprisingly found out that there were some individuals in his herd starting to behave strangely. Suddenly, they became over-excited: some ran restlessly, some jumped around continuously and some even pranced which made Kaldi imagine that they were dancing in an exuberant manner. Being motivated by the strange event, the young goatherd followed the trails and figured out his goats have chewing some cherry-colored berries grown on nearby trees. He then ventured to try eating it and soon felt elated and energized. Doubting this could be a miracle, he ran to a chief monk in local monastery and presented these magical berries. The monk, in spite of his first impression, claimed that these forbidden berries belonged to devil, thus casted it in the fire. However, the more the berries were scorched, the more fragrance the room was filled with. Naturally, the irresistible favorable scent not only changed the monk's mind, but also attracted other monk's attention and eventually convinced him that those berries were a gift from the heaven. They started to have the magical berries roasted, crushed then mixed with water and together they shared the joy of tasting a new wonderful God's gift. Strangely, the excitement and alertness arouse within them and never before that, they could stay awake all night to chant comfortably for the first time. Later on, resident of Kaffa (Ethiopia nowadays) acknowledged its potential and began to cultivate it on large scale, hence became the world's first producer of coffee in the 14th century. In order to provide more evidence, the writer would like to present a short excerpt by an Italian historian Faustus Naironi, expressing his opinion about the origin of coffee: *“A certain person that looked after camels, or, as others report it, goats, [this is the common tradition amongst the Eastern people] complained to the religious of a certain Monastery in the Kingdom of Ayaman [Yemen], that is Arabia Felix, that his herds twice or thrice a week, not only kept awake all night long, but spent it in frisking and dancing in an unusual manner. The Prior of the Monastery, led by his curiosity, and weighing the matter, believed this must happen from the food of the creatures: Marking, therefore, diligently, that every night, in company with one of the monks, the very place where the goats or camels pastured, when they danced, found there certain shrubs or bushes, on the fruit or rather berries of which they fed. He resolved to try the virtues of these berries himself; thereupon, boiling them in water, and drinking thereof, he found by experience, it kept him awake in the night. Hence it happened, that he enjoined his Monastery the daily use of it, for this procuring watchfulness made them more readily and surely attend their devotions which they were*

obliged to perform in the night. When, by this frequent use of it, they daily experienced its wholesomeness, and how effectually it conduced to the preserving them in perfect health, the drink grew in request throughout the whole Kingdom, and in progress of time, other nations and provinces of the East fell into the use of it. Thus by a mere accident, and the great and wonderful providence of the Almighty, the fame of its wholesomeness spread itself more and more, even to the Western parts, more especially those of Europe”.

Back into the IX century, according to archaeological and handwritten notes, it can be assumed that Kaffa (Ethiopia nowadays) is the land of origin of coffee. However, not until the XIV century did traders realize the economic potential of this commodity. Consequently, coffee followed the path of slave traders, crossed the Red Sea to Arabian regions. It was warmly welcome, although only after 100 years did they know how to roast it and use it as a drink. Naturally, coffee has become a traditional drink of Arabian and Arab was known as an exclusive producer of this special commodity. Harbor city Mocha or Mokka (Al Mukha, Yemen as we now know) had once become the most popular trading centers of coffee. Apparently, Arabians were pretty proud of their invention in coffee processing. Therefore, many strong discouragement policies were implemented to protect Arabian monopoly position, typically: “Only roasted coffee seeds are allowed to export” or “Foreigners are forbidden to wander near coffee plantations”. But no matter how strict the prevention was, coffee still spread through all middle-east regions, thanks to foreign visitors who showed special interest in the wonderful drink and took the risk of carrying its unroasted seed out of Arab. (*“The world of caffeine”, Bennett Alan Weinberg, Bonnie K. Bealer, 2001*).

After many fail attempts, Netherlanders was the first European folk managed to bring coffee seeds to their homeland. Java Island, where Netherland had dominance over, was chosen to be the place for experiment of coffee plantation. The test has gained some positive results, although it was insufficient. The main reasons were because of the difference in atmosphere, heat, rainfall, moisture and weather that prevented coffee plants from reaching its maximum production potential. At the same time, France also tried their luck on plating coffee trees. By the year 1720, De Clieu, a French naval officer, decided to bring a coffee plant originally received from Netherland to Martinique – one of French colonies – where he guarded (*Lacour, p. 235f*). During the sea journey in which fresh water was limited, De Clieu shared his water rations with his coffee plant and took serious care of it. As soon as the ship docked, the tree was planted, of course, in a secret place guarded by three soldiers regardless of time. The tree grew quickly and provided more seeds for large-scale plantation. As a result, after 50 years, France became a formidable competitor against Netherland in European coffee market. Serious conflicts arose so Brazil had to step in to negotiate. Taking advantage of the chaos situation, Brazilians succeeded in bringing coffee seeds to their hometown, began the true era of coffee in which Brazil is the ruler and converted all Middle-South American regions into the most powerful empire of coffee in the world.

3.2 Types of coffee and its distribution in Vietnam



(*r*: primarily Robusta; *a*: primarily Arabica; *m*: Both Robusta and Arabica) (Source: USDA Hawaii Farm Facts, 2012)

In general, coffee plants are listed as a tropical perennial crop, originated from Africa and usually come with strict ecological requirements. It is true that atmosphere, soil and irrigation are the most crucial factors determining the production of this type of plant. By properly understanding coffee’s traits, one would be able to maximize its potential value, thus increase the final output. Although there are numerous species of coffee around the world, only two kinds were qualified for intensive production, named Arabica and Robusta.

Table 3.2.1 Comparison between Arabica and Robusta coffee

Description	Arabica	Robusta
Origin	From Jimma Highland, South-east Africa, Ethiopia.	From Congo river area, equatorial area and tropical West Africa.
Average caffeine concentration	1.5%	Between 1.5% and 3%
Overall description	Shrub type, 3 – 4 meter tall. Soft, drooping and symmetric branches.	Single or multiple body type, 8 – 12 meter tall (if not pruned).

Leaves	Symmetrically distributed. Long oval shape and pointy. Dark green curly edges.	Oval or crescent shape and pointy. Wavy lamina.
Fruits	Ovate shape. Turn scarlet when ripen.	Round or ovate shape. Turn red or pink when ripen.
Seeds	Round and flattened. Light green or gray-green	Round and thick. Smaller than Arabica. Light brown or green-brown.
Ideal growing conditions	On plateau (1000 – 1500 m above sea level). Average temperature is between 15 and 34 degree Celsius. Annual rainfall is 1500 – 2000 mm.	0 – 700 m above sea level. Average temperature is between 24 and 30 degree Celsius. Annual rainfall is 2000 – 3000 mm. Require more sunlight than Arabica.
Duration from florescence to ripening	9 months.	10 – 12 months.
Florescence	After rains.	Random.
When ripened	Fruit falls.	Fruit sticks onto branches.
Yield (tonnes/hectare)	1.5 – 3.4	2.3 – 5
Type of roots	Deep roots	Shallow roots
Age of harvesting	3 – 4 year old.	3 – 4 year old.
Harvesting duration	Around 20 years.	20 – 30 years.
Main producers	Brazil, Colombia, Ethiopia, Mexico, Guatemala, Honduras, Peru and India.	Vietnam, Indonesia, Côte d'Ivoire, Uganda, Brazil and India.

(Source: Vicofa, synthesis)

At the moment, Arabica and Robusta are the most two popular types of coffee used for massive production, in which Arabica accounts for 75% of world coffee production and Robusta makes up about 25% (“*Arabica and Robusta Coffee Plant*”, *Coffee Research Institute homepage, 2012*). The contribution of other branches is negligible. Arabica usually receives superior assessment due to its flavor and is normally served as roasted coffee powder

while Robusta is frequently used for production of instant coffee. The amount of caffeine in each type is a crucial point causing the difference in taste. More specifically, in average, an Arabica bean is consisted of 1.5% caffeine, while the amount of caffeine in Robusta is double than that of Arabica. As a result, Robusta has a bitter flavor comparing to Arabica, thus, is less preferred in top market such as New York or London. The title of highest production of Arabica is taken by Brazil, while that of Robusta belongs to Vietnam. In fact, Vietnamese coffee production for export is mainly composed of Robusta.

Coffee is usually cultivated primarily in tropical regions such as Central and South America (Brazil, Mexico, Colombia...), Africa (Kenya, Cameroon, Ethiopia, Tanzania...) and Asia (Vietnam, Indonesia, India, Philippines, Malaysia...). All of them share the same characteristic: they all produce Robusta and Arabica coffee, although specific ration is quite different. While South American regions are inclined to Arabica coffee production and South-east Asian nations tend to concentrate on Robusta, farmers in South Africa decide to maintain the balanced ratio of both types of coffee.

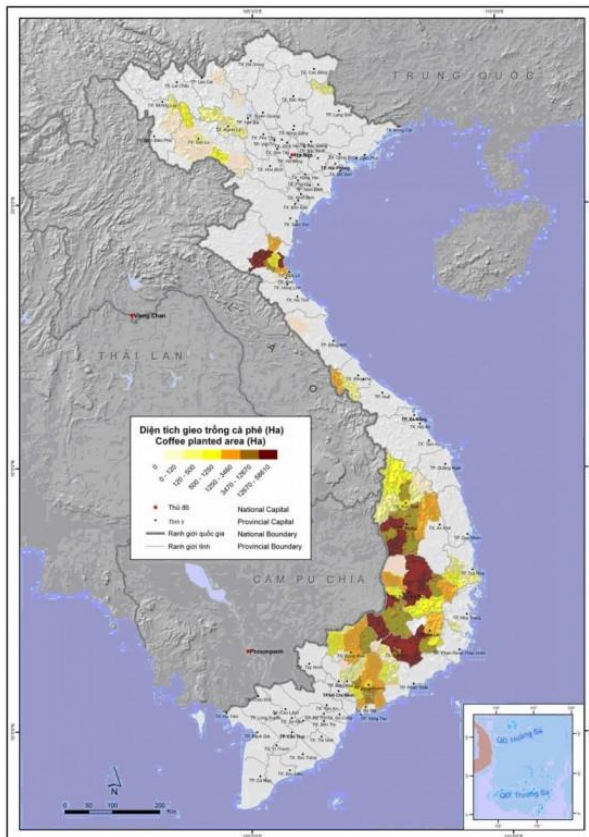


Table 3.2.2 Coffee plantation area in Vietnamese provinces

Province	2013	2014
Dak Lak	207.152	210.000
Lam Dong	262.565	153.432
Dak Nong	122.278	122.278
Gia Lai	77.627	78.030
Dong Nai	20.000	20.800
Binh Phuoc	14.938	15.646
Kontum	12.158	13.381
Ba Ria Vung Tau	7.071	15.000
Son La	9.000	10.650
Quang Tri	5.050	5.050
Dien Bien	3.385	3.385
Others	5.700	5.700
Total	635.924	653.352

(Source: Vietnam Department of Agricultural and Rural Development, 2014)

Vietnam, an S-curved country, produces both Arabica and Robusta types of coffee, although more than 90% of coffee production is composed by Robusta. Coffee plants are distributed on Tay Nguyen highland (such as Dak Lak, Lam Dong, Dak Nong, Gia Lai, Kontum), at South-east plains (Dong Nai, Binh Phuoc, Ba Ria Vung Tau) and at some northern provinces (Son La, Quang Tri, Dien Bien). According

to Vietnam Department of Agricultural and Rural Development, by the year 2014, the total area for growing coffee reached approximately 653.000 hectares. Preferring cool temperature and low sunlight intensity, Arabica plants were grown principally at Northern provinces, however, only at a relatively small scale (around 19.085 hectares). 88% of coffee growing area (approximately 577.121 hectares) was assigned to Tay Nguyen's provinces whose coffee production made up to 91.4% (957.429 tonnes) Vietnam coffee bean production.

Tay Nguyen is consisted of five provinces from North to South: Kon Tum, Gia Lai, Dak Lak, Dak Nong and Lam Dong, with the natural area of 54.474 km² (accounted for 16.68% national natural area). Although coffea are grown in all five provinces, only there are only three key areas specializing on massive production of coffee plants. In addition, the amount of coffee produced in Tay Nguyen is approximately 900,000 – 1,000,000 tonnes annually, made up to 80 – 90% of Vietnam coffee production. There are many reasons promoting Tay Nguyen to become the biggest Robusta producer not only in Vietnam, but also in the world. The first reason lies in the characteristic of soil: Basalt. It is porous and fertile. Statistically, Tay Nguyen is composed of 74.25% of this rich red-orange soil, ideal for cultivating high economic – value perennial plants, such as coffee, rubber, pepper and cashew plants... as well as many other fruit trees. It is because of strong hydrophilic nature and water-retention ability of Basaltic soil that coffee plants are able to survive under extremely dry weather, while still enjoying the high intensity of sunlight.

Secondly, Tay Nguyen is located in equatorial atmosphere with the average height of 500 – 600 m, ideally suitable for growing Robusta type. This combination results in division of atmosphere into two distinct seasons: rainy and dry. While rainy seasons normally begin in May and end in October, dry season's period is from November to following April. During rainy seasons, climate is hot and humid, but rain is frequent and heavy. More specifically, 85 – 90% of Tay Nguyen's annual average rainfall (approximately 1700 – 1800 mm) occurs during this period, which is coincidentally also the growth state of coffee fruits. This is the state when the plants require a massive amount of water and nutrition for fruition, thus, the farmers can get rid of irrigation worry. Nevertheless, dry season comes as soon as the harvesting time ends (in October/November), possibly bringing months of droughts and prolonged heat. Farmers need to keep manuring and start irrigating at a reasonable amount until February when the plants flower. Moreover, local farmers have also put a lot of efforts in breeding selection process, enhanced the methods for irrigation and protection so that the overall yield per hectare has improved significantly. In a nutshell, Tay Nguyen possesses many outstanding natural features along with dedicated local labor force, allowing its coffee production industry to thrive on in a steady and stable manner, generating nearly 2.2 billion dollars annually for Vietnam (*Le Ngoc Bau, Director of Agriculture –Forest Science and Technology Institute, 2014*).

3.3 Coffee cultivation in Vietnam

It is true that every country exporting coffee has its own natural conditions, type of coffee planted and cultivating methodologies. These factors created diversity in coffee beans, not only in its type (Robusta or Arabica), but also in its quality (flavor, scent, color, shape, etc...). The following content is based on many trustworthy sources, on Vietnamese farmer's experience and on author's knowledge.

One of the factors affecting the production of coffee is the characteristics of coffee plants. Because they are perennial crops, it usually takes 3 – 5 years to harvest since the first investment (*Vicofa*). In addition, unlike other food crops, coffee plants only have one harvesting season each year. Therefore, the amount of coffee supplied is frequently fixed in short run because it cannot quickly response to any sudden opportunity, regardless of saving amount. For example: Vietnamese average production of coffee during the last 5 years was calculated to be around 1.3 million tonnes but domestic consumption was merely 70 thousand tonnes (*FAO, 2015*). Consequently, the authority decided to shift their concentration to export and prefer it to domestic demand. If the demand suddenly rises, requiring over 100 thousand tonnes within a short time (several months or 2 – 3 years), there is a low probability that there will be sufficient quantity supplied to satisfy the need. It is due to the fact that farmers usually need 3 – 5 years for the new plantation area become harvestable. Hence, any changes in demand within a short duration don't have much immediate impact on supply, unless private storage is opened for sale. (The impacts of private storage on supply will be explained more specifically later in Chapter IV).

Although coffee production is not likely affected by demand in short run, it does suffer from lack of water. In fact, water plays an extremely vital role in the survivability of not only coffee, but all kinds of plants. In case of coffee, irrigation is among the most crucial factors determining the final productivity, quality and quantity of coffee harvested. Even nowadays, many irrigation works have been built to serve coffee's needs, especially in developed countries such as Brazil, Colombia; draughts are still frequently reported as a main perpetrator of crop failures. According to FAO, the total amount of water supplied for a single coffee plant is 1.388 mm each year. However, the figure is not meant to be equally split for monthly irrigation. In contrast, each coffee plant in each region grows under different natural conditions (such as soil, atmosphere, temperature, moisture, light intensity, etc.), thus requires different irrigation schedule. For instance: The main type of coffee plant in Vietnam, Robusta, requires a large amount of water supplied for growth and florescence. Although Robusta prefers high intensity of sunlight, it has really low ability of drought tolerance. In rainy seasons, occurring between May and October, there is plenty of water for Robusta fruit to grow at its maximum potential. However, in dry seasons, especially from January to April, drought rages on, resulting in severe lack of water. Estimated rainfall during this time is

merely 113 mm (*Dam Thuan, Dak Lak newspaper, 2014*). More importantly, Robusta plants usually flower in February, hence, they require approximately 529 mm water supplied each during the whole season, which nature clearly cannot satisfy (*Dam Thuan, Dak Lak newspaper, 2014*). Lack of water may cause Robusta unable to flower, or even survive. One of the solutions for this difficulty is indeed irrigation. By applying irrigation at appropriate level and frequency, this method will effectively stimulate the growth of plants, resulting in higher productivity and superior product quality.

Another important factor affecting the production of coffee is fertilizer. Like other perennial crops, coffee requires plenty of nutrition for its optimal growth, especially three mineral substances: Nitrogen (N), Phosphorus (P) and Potassium (K). These essential components are usually combined into a single fertilizer, along with manure, is applied to the trees throughout the whole year. However, fertilizing, which is similar to irrigation, cannot be applied arbitrarily. According to experts, improper manuring not only results in waste of resources, but may also bring many negative effects to coffee plants. For instance: fertilizers are usually applied mostly in rainy seasons due to the high growing activity of coffee plants during this duration. It is generally true that water effectively enhances the growth of coffee, thus greatly stimulate its ability of absorbing nutrition. In contrast, if applied with great amount during dry seasons, fertilizer may not be fully absorbed by the plants due to lack of water (since water is a crucial conductor for plants to uptake nutrition). Therefore, the residual may poison the soil on which coffee plants rise, inhibit the growth of plants and sometimes can even kill them. Thus, manuring requires grower's caution and accuracy. In order to achieve the optimal potential of production, farmers must adhere to many strict principles when it comes to fertilizing. For example: the appropriate amount of fertilizer for manuring at a specific time must be assessed based on several criteria, such as: the actual age of the plants (growing/producing/aging), the current season, the current growth state of the plants, etc...

Another unpleasant problem in coffee plantation is pests and diseases. Several coffee's most dangerous pests and diseases in Vietnam are: mealybugs, rust disease, pink disease and anthracnose disease. Coffee plants infected by these diseases usually suffer from shedding, dry twigs, fruit falling and even deaths. In fact, a proportion of Vietnamese farmers still don't recognize the importance of periodical check for these diseases, or if they do, they usually give just a cursory spray (perhaps it is due to lack of capital or poor knowledge). This is a fatal mistake, since without proper control and preventive measures; coffee production will be severely affected and may take a considerably long time before regaining its former position. Therefore, when it comes to cultivation, coffee growers must take regular investigation into account. If any disease or bugs are found, immediate appliance of pesticides or fungicides must be executed to prevent further damage and expenses. Moreover, the planting area must always be kept clean and ventilated, especially in rainy seasons when humidity is high in order to prevent the growth of fungi and pests.

3.4 Harvesting – Processing – Manufacturing

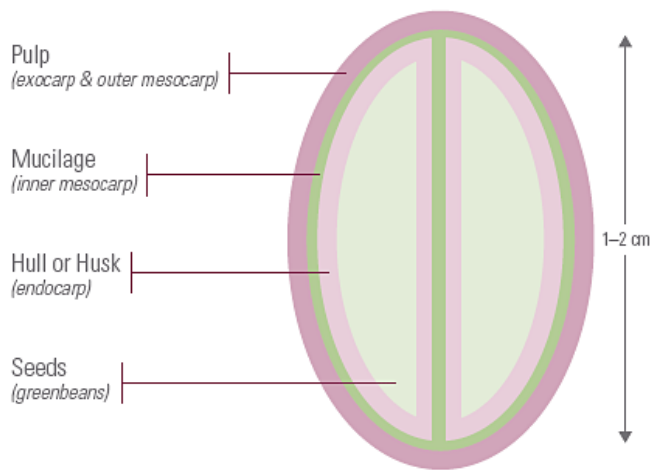
Apparently, before being served, coffee beans have to undergo through many processing steps. Fundamentally, there are three main procedures: harvesting, processing and manufacturing. Depending on specific regional characteristics (harvesting time, temperature, hours of sunlight, etc.), technology applied and quality standards, each country has its own harvesting methodology and different way of processing. Within the limited range of the bachelor thesis, the author will represent the harvesting – processing – manufacturing procedure of coffee primarily in Vietnam. The content is a synthesis of many trustworthy sources (Vicofa, tracaphe.com, vncafe.com) and from farmer's experience.

The first step is harvesting. This process can be done by hand or machinery. However, machines are mostly used in Brazil where coffee farms are huge and the ground is quite flat. In Vietnam, coffee harvested is primarily distributed in Tay Nguyen, where farms are quite small and the terrain is steep. In addition, labor wage in Vietnam is relatively cheap; hence hand harvesting is the most economical solution. Moreover, hand harvesting also enables farmers to choose between two types of picking most suitable for their plans: whole picking or selective picking. If the rains were frequent and regular during the season, enabling a majority of coffee plants to flower at the same time (hence its fruits are also ripened at the same time), whole picking can be applied. This method is conducted by plucking along branches, getting both the fruits and leaves. The advantages of this type of picking are faster operation, less conducting time and less labor force required.

However, during seasons when fruits are not identically ripened, picking in this way will result in bad quality of coffee harvested since a large portion of over – ripened and under – ripened fruits will be mixed with ripened ones. Coffee sacks with low percentage of well – ripened beans are not qualified for exporting, especially to high – standard markets such as Europe or America. In this case, selective picking is the optimal solution. The harvesting duration is divided into multiple conducting times in which farmers only pick ripened fruits and retain green ones. The advantage of this type is an extremely high percentage of ripened fruits (at least 95%) during the whole season, resulting in better quality of coffee harvested. In return, this method requires longer time, more labor force, thus may greatly increase production expenses.

Coffee harvested must be processed immediately, which leads to the next step: processing. During this step, coffee pulp and husk are removed and seeds are retained. This process can be done in two ways: dry processing or wet processing. The first method (dry processing) is commonly applied in Asia, Brazil and Africa. 60% of world coffee seeds are detached from its husk by this method. Taking advantage of long hours of sunlight during dry season, most of Vietnamese farmers have chosen this classic way of processing coffee fruits. In more detail, the fruits are washed and screened from dust, rock and leaves before being dried by natural

The Coffee Cherry (Fruit)



(Source: greencoffee.org)

heat from the Sun. Commonly it takes around 25 to 30 days for the humidity inside the fruits to drop below 12 – 13%, depending on weather conditions. Following that, the dried fruits are delivered to a milling machine where both the pulp and husk are removed, leaving only the seeds. Simplicity, inexpensive, and no side effects are the benefits of dry processing.

The other method (wet processing) requires a little bit more efforts. Similar to dry processing, coffee harvested must be sifted through a grid to get rid of unwanted impurities. Following that, the fruits are delivered to a special milling machine where most of the fresh pulp is removed. The remaining is not only the seeds, but also the husk, a viscous layer called mucilage and of course a small amount of pulp clinging to the seeds. In the next stage, all of them are sunk into water tanks for 24 – 36 hours, depending on the temperature. This stage is called fermentation stage as “the remainder of the pulp is removed by breaking down the cellulose by fermenting the beans with microbes and then washing them with large amounts of water” (geishacoffee.com). The mucilage is removed during this stage too. Subsequently, the wet seeds coated with husk are dried in the ovens until its humidity falls below 10 – 12%. Finally, it is transferred to a milling machine where the seeds are separated from its husk, being packed and later sold to the market. The benefit of using this method is that the duration required is short, which in fact is much shorter than that of dry processing. However, it has certain negative side effects. Firstly, it requires a relatively large sum of water supplied to fill in the tanks, which increases the production cost. Secondly, during fermentation stage, fermenting activities release a lot of unfavorable – smelling compounds into the air. If the air flowing system is awful or not well – equipped, the gases may become poisonous. Last but not least, if used water is discharged directly to public water sources (rivers, lakes, or even groundwater) without any treatment, it may seriously poison the environment at fatal level. If one is about to apply wet processing, he or she must make sure that all regulations of water treatment are strictly followed.

The last step, although may not be obligatory to coffee production industry, is a must in coffee manufacturing industry. Usually, coffee beans acquired from the above two steps are packed in 60 kg sacks and traded around the world. However, when it comes to a drink, coffee must be manufactured before being served. Although there are numerous ways of enjoying this special drink, only two primary forms are manufactured: roasted coffee and instant coffee.



Roasted coffee

(Source: Turkishcoffee.org.uk)

In fact, different coffee has its own origin, characteristics and cultivation routine, thus providing different unique flavor. By roasting coffee, the flavor changes accordingly to the level of roasted. During roasting process, numerous chemical reactions take place, resulting in a formation of various brand new compounds bringing out the true flavor and aroma of coffee beans. Here is a citation of how general coffee beans are roasted: “The coffee roasting process follows coffee processing and precedes coffee brewing. It consists essentially of sorting, roasting, cooling, and packaging but can also include grinding in larger scale roasting houses. In larger operations, sacks of green coffee beans are hand or machine-opened, dumped into a hopper and screened to remove debris. The green beans are then weighed and transferred by belt or pneumatic conveyor to storage hoppers. From the storage hoppers, the green beans are conveyed to the roaster. Initially, the process is endothermic (absorbing heat), but at around 175 °C (347 °F) it becomes exothermic (giving off heat). For the roaster, this means that the beans are heating themselves and an adjustment of the roaster's heat source might be required. At the end of the roasting cycle, the roasted beans are dumped from the roasting chamber and cooled with forced air. In Vietnam, coffee is often coated with oil (traditionally clarified butter) and a small amount of sugar prior to roasting to produce a "butter roast". The roasting process results in an additional caramelized coating on the beans.” (*A calorimetric study of self-heating in coffee and chicory*, Raemy A, Lambelet P., 1982; *Asia's best coffee – Vietnam*, Eckhardt Robyn, 2014; *An overview of Vietnamese coffee*, Heirloom Coffee, 2014). The roasted beans are grinded into powder before packed into tiny tea bags for casual consumption or into special capsules for coffee machines. After being soaked (for a few minutes) or pressurized by hot water to make a drink, the coffee powder is disposed.

Turning to instant coffee, this is a new trend of drinking coffee nowadays. Staying true to its name, instant coffee is most suitable for RTD (Ready – to – drink) café and/or young generations. Basically, it can be said that instant coffee is an evolution of roasted coffee. Here is a citation of how general instant coffee is made: “As with regular coffee, the green coffee bean itself is first roasted to bring out flavor and aroma. Rotating cylinders containing the green beans and hot combustion gases are used in most roasting plants. When the bean temperature reaches 165 °C (329 °F) the roasting begins, accompanied by a popping sound similar to that produced by popcorn. These batch cylinders take about 8–15 minutes to



Instant coffee

Source:

http://en.wikipedia.org/wiki/Instant_coffee

complete roasting with about 25–75% efficiency. Coffee roasting using a fluidized bed only takes from thirty seconds to four minutes, and it operates at lower temperature which allows greater retention of the coffee bean aroma and flavor. The beans are then ground finely. Grinding reduces the beans to 0.5 – 1.1 millimeter pieces in order to allow the coffee to be put in solution with water for the drying stage. Sets of scored rollers designed to crush rather than cut the bean are used. Once roasted and ground, the coffee is dissolved in water. This stage is called extraction. Water is added in 5–10 percolation columns at temperatures of 155 to 180 °C (311 to 356 °F); this concentrates the coffee solution to about 15–30% coffee by mass. After filtration, this may be further concentrated before the drying process begins by either vacuum evaporation or freeze concentrations.” (http://en.wikipedia.org/wiki/Instant_coffee). Unlike roasted coffee, instant coffee can be dissolved in hot water and immediately served. Moreover, it can be mixed with sugar and milk powder at any ratio to suit customer’s needs. Currently, the popular 3 – in – 1 instant coffee consisting of coffee powder, sugar and milk is a typical example.

3.5 Well-known trademarks in Vietnam

Coffee is listed among the most appealing industries in Vietnam, reflecting through the harsh competition between three big companies: Nestlé, Vinacafé Bien Hoa and Trung Nguyen in an attempt to win market shares.

According to statistics derived from Vicofa, total output of factories manufacturing 3 – in – 1 coffee (coffee, sugar and milk mixture) across the country was 88.700 tonnes during 2014. The figure was also forecasted to almost double to 164.400 tonnes by the end of 2015. Currently, there are three companies who took the lead in instant coffee production: Nestlé Vietnam (with annual production of 56.200 tonnes), Vinacafé Bien Hoa (with annual production of 33.200 tonnes) and Trung Nguyen (with annual production of 32.000 tonnes). According to the estimation, 90% of instant coffee market share were held by these three companies for decades, with the deviation of 1 – 2% depending on specific period.

3.6 Government supporting policies

One of the factors contributing to the remarkable success of Vietnam coffee industry is no doubt the support and encouragement from the government (*Report No. 29358, Department of Agriculture and Rural Development, 2004*). In fact, coffee has been under protection of the government in terms of trademark, product price and exporting activities. In addition, the authority also took part in many different sectors of market such as input, production, manufacturing processes and market approaches. Douglas North once defied institutions as “*humanly devised constraints that structure political, economic and social interactions*” (1983). His words ringed true to Vietnam.

Although the participation had a tendency to follow free market mechanism, the government still had great influence on coffee market in particular and the whole economy in general (*Department of Agriculture and Rural Development, 2004*). Moreover, numerous associations, in which Vietnam Coffee and Cocoa Association (Vicofa) is among the most prominent, have been granted permission to establish in order to facilitate the development of this commodity. These organization’s main duties can be summarized into several points: Strictly follow government’s directives; protect each other against any kind of monopoly, bad competition or violation to one’s interest and benefits on coffee market. For years, these associations have greatly contributed to the growth of national coffee industry.

However, the inner potential of this nation’s coffee industry has not yet fully revealed. According to statistics, Vietnam has ranked second in world top coffee producers for 15 years straight, with average annual production of more than one million during the last 8 years (*FAO, 2015*). In addition, coffee industry also plays an important role in foreign trade, generating billions of dollars of export revenue every year (*Vicofa, 2014*). Currently, more than 70 countries are importing coffee from Vietnam, indicating a vast market full of promising opportunities for this country. Along with inborn advantages of coffee market, coffee industry in Vietnam is competent of not only capturing more market share, but perhaps also winning more global achievements in the future. Recognizing the enormous potential as well as the importance of coffee to the economy, the government has set out numerous incentive and preferential policies to promote the development of this industry.

Another crucial privilege of the government in coffee market is the ability of price intervention and debt freezing. In times when prices were at lowest points, threatened both the stable growth of the industry and farmer’s living, the government has established a series of actions and subsidies so as to support the industry. For instance, in 1990s, the rapid growth of Vietnam coffee industry had resulted in an abnormally large supply, caused world coffee price to significantly drop. Shortened revenue resulted in farmer’s inability to pay debts. Many banks that generously financed coffee industry then could not claim their dues and had to face big NPLs (non-performing loans). Noticing the threat, the government decided to take action.

According to Department of Agriculture and Rural Development, in 1990s, Department of Finance has established a fund named National Price Stabilization Fund and called for farmer's contributions as an act against the plunge of coffee price. Throughout the decade, a majority of coffee exporters had agreed to contribute at a rate of 150 – 300 USD/ton of coffee exported, depending on corresponding price (which was around 1,500 USD/ton at that time). The purpose of this establishment was to have a spare source of capital for supporting farmers when coffee price dropped below production price. However, the fund was dissolved in 1998, made way for the establishment of Export Supportive Fund (ESF), intended for supporting primarily governmental enterprises in coffee exporting activities. The purposes of these funds were relatively identical, except there was a remarkable cut in contribution for ESF (only 0.3 USD/ton was required as supplement taxation).

The above solution, which had some positive results upon price management though, could not save coffee growers from their increasing debts. Hence, in 2001, the government required all the banks to freeze their debts for three years. These debts were later considered again in July 2014. Additionally, numerous non-interest preferential loans provided by the government were set out to help both domestic coffee growers and exporters. In general, especially since 2001, the acts of the government and financial institutions were beneficial to both coffee growers and exporters. To foreign trade, plenty of policies and tariffs intended for encouraging foreign investment were issued. In 2002, a regulation was set out, allowed foreign enterprises to export coffee (*Circular 26/2001/Department of Commerce*). In addition, fertilizer import tax was cut down to less than 5% (3% for NPK fertilizer and 5% for phosphate fertilizer). Repayment period for farmers was lengthened and many barriers prevented foreign companies from obtaining land use rights were also crossed off.

However, governmental intervention and participation in market chains also had many drawbacks. Although being the guider and controller of coffee market since its very beginning, the authority used to be not quite sufficiently competent for that position. Government's initial limited vision along with poor expert knowledge of management had caused misrule planning of coffee plantation, uncontrollable output and being fail to capture valuable opportunities (*Department of Agriculture and Rural Development, 2014*). The government also showed signs of unprepared and unforeseen in their policies appliance. Moreover, farmers were always in lack of proper information about coffee production and price, thus numerous coffee plantations had freely mushroomed, resulting in a sudden boost in world coffee production which caused coffee price to significantly drop. This vast expansion not only brought bad effects to the economy, but also to the environment as thousands hectare of the forest had been destroyed to make way for coffee plantation. Although governmental vision has been extended and the control has been tightened, the negative consequences of 1990s supply surplus have not yet completely disappeared.

Chapter IV – Analysis

4.1 World coffee production

4.1.1 World production of coffee throughout 30 years

Map 4.1.1 Distribution of coffee production in the world in 2013



Table 4.1.1 Top coffee producers

Area name	Value (tonnes)
Brazil (A/R)	2,964,538
Viet Nam (R/A)	1,461,000
Indonesia (R/A)	698,900
Colombia (A)	653,160
India (A/R)	318,200
Honduras (A)	273,480
Ethiopia (A)	270,000
Peru (A)	256,241
Guatemala (A/R)	253,186
Mexico (A)	231,596

A: Produce only Arabica
R: Produce only Robusta
R/A: Produce both, but primarily focus on Robusta
A/R: Produce both, but primarily focus on Arabica

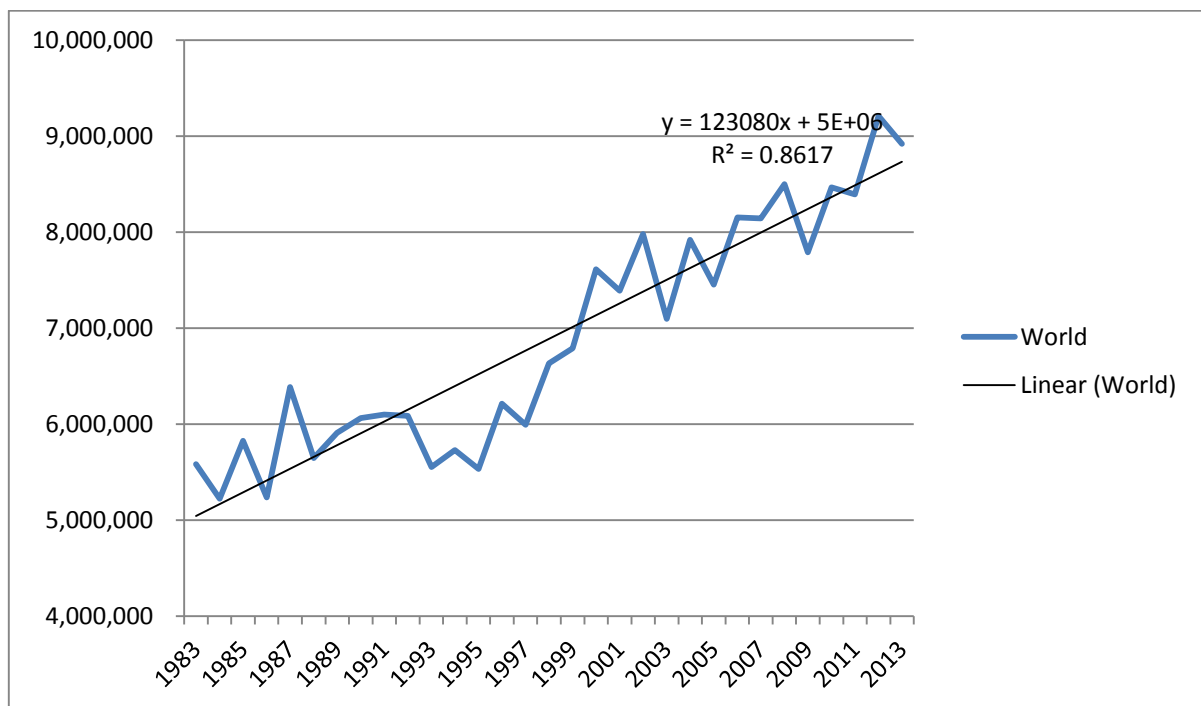
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According to statistics derived from Food and Agriculture Organization of The United Nations (FAO), by the end of the year 2013, world coffee production reached 8,920,839.68 tonnes. At the leading position, Brazil produced approximately 2,965,000 tonnes of coffee during 2013, accounting for about one third of global coffee production. This means that Brazil alone would supply more than enough coffee beans for one of the biggest coffee consumers: United States, whose annual consumption was around 1,452,000 tonnes (FAO, 2015). Brazil has maintained this title for more than 150 years (Neilson & Pritchard, 2009). In addition, the country is unrivaled in total production of green coffee, Arabica coffee and instant coffee (“World trade of soluble coffee”, International Coffee Organization, 2013). It was because world coffee

production heavily relied on that of Brazil, its production directly affected global coffee price on the market. As a result, Brazil has become a tycoon in world coffee industry and played a vitally crucial role in paving the way for other coffee producing nations.

The second position belonged to Vietnam whose coffee production was as half as that of Brazil (1,461,000 tonnes). However, the amount of Arabica produced in Vietnam was still scanty and most of permanent crops land was still used for cultivating Robusta. Indonesia and Colombia took the third and fourth place as one of the biggest coffee producers 2 years ago, with 698,900 tonnes and 653,160 tonnes respectively. Honduras and Ethiopia shared the same amount of coffee production, around 270,000 tonnes, claimed the fifth and sixth places. The last three positions in 2013 top ten coffee producers were given to South-America nations: Peru, Guatemala and Mexico whose productions were around 250,000 tonnes each.

Graph 4.1.1 World coffee production (in tonnes) from 1983 to 2013



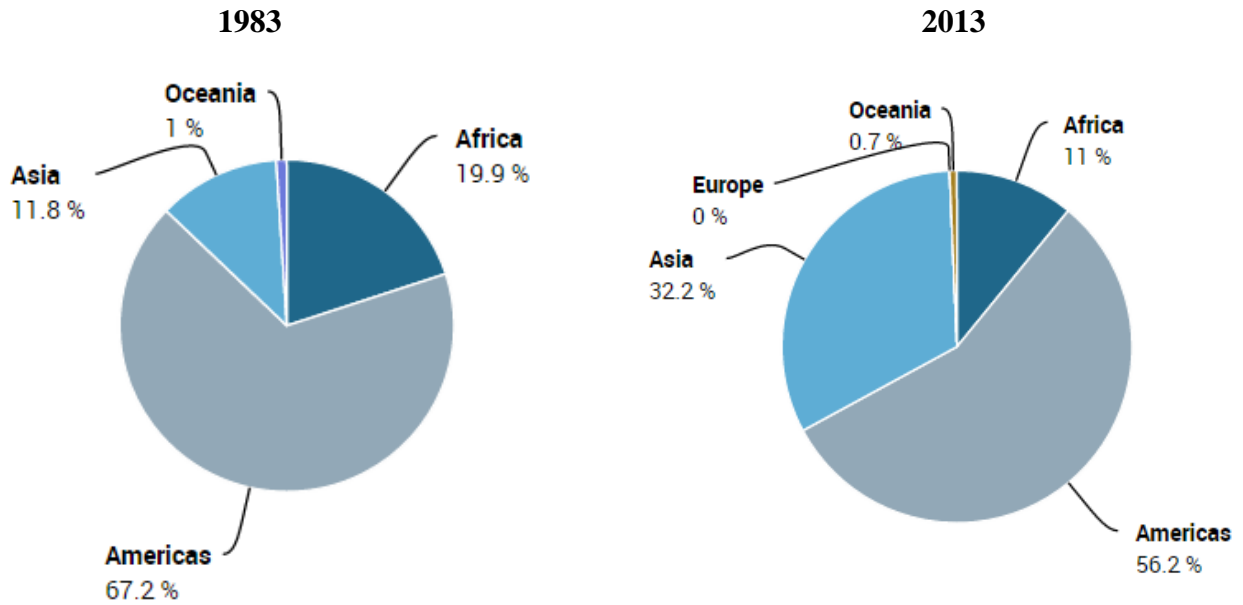
(Source: FAO, 2015)

In general, the growth of world coffee production since 1983 is an upward trend, although it is quite volatile. As can be seen, there was a plunge during 1993 to 1998, indicating sudden shrink of production. The trend bottomed out in 1994 and later in 1996, coincided with two big crop failures which took place in Brazil, due to prolonged draught and sudden tragic hoar – frost. However, the trend still managed to go up due to new participation in production of

many other tropical countries, especially Vietnam in 1990s. However, in spite of plenty of fluctuations, the development of world coffee industry is still remarkable and worth noticing.

4.1.2 Comparison of coffee production share by region

Graph 4.1.2 Comparison of coffee production share by region in 1983 and 2013



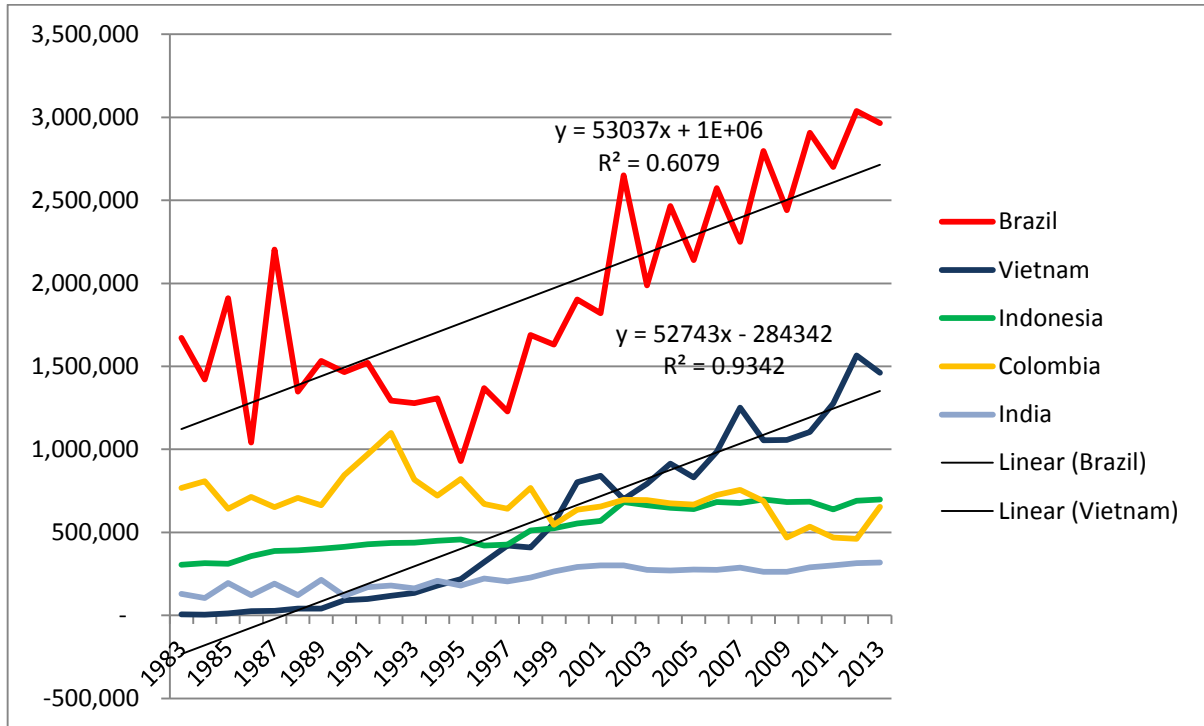
(FAO, 2015 Statistics)

The two pie charts compare the proportion of coffee production which The Americas, Asia, Africa and Oceania contributed in two separate years. According to statistics obtained from FAO, global supply of coffee has increased by 59.8% during the 30 year period and there was no clear indicator signaling that the trend would cease from increasing. More specifically, world coffee production was reported to be 5,582,080 tonnes in 1983 and 8,920,840 tonnes in 2013.

As can be seen, the largest proportion of coffee production, which were two-thirds in 1983 and more than half in 2013, belonged to The Americas, claiming its leading position in coffee industry. However, there was a slight drop in production share. In more detail, the production proportion of these Central and South nations in 2013 was 11% less than that of 1983, even though their production has noticeably jumped by 1,257,337.78 tonnes. This phenomenon occurred because of an extraordinary increase in Asian production share. In spite of their low market share in 1983 (11.8%), these Asian countries have significantly extended their scale of coffee production and managed to win 20.4% more by the end of 2013. Last but not least, there was a shrink in African and Oceanic production share. Even though accounting for one fifth of world coffee production in 1983, both of the continents now only made up to merely 12% of market share.

4.1.3 Coffee production of Top 5 producers throughout 30 years

Table 4.1.3 Coffee production of Top 5 producers from 1983 to 2013



(Source: FAO, 2015)

According to statistics derived from FAO, in an overall view, coffee production's trend is upward, reflecting the rapid increase in demand for this special commodity. In an overall view, Brazil and Vietnam were the two producers having the fastest developing speed in coffee industry. Indonesia and India experienced a slight expansion in coffee production while Colombia's coffee industry in contrast, actually suffered from recession.

One of the first noticeable points is that Brazil has been dominated coffee industry throughout 30 years since 1983. Thanks to the Brazilian government's intervention, the improvement in raising method and application of high technology into cultivation and harvesting, Brazilian coffee industry has doubled at the end of 2013 after 30 years at nearly 3 million tonnes. However, in 1994, Brazil underwent a sudden tragedy: a formidable hoar – frost brought massive destruction to a large proportion of area used for coffee plantation, which were also suffering from a prolonged draught until 1997, resulting in a heavy loss in the world coffee production, causing price to rocket.

Taking advantage of the situation, in addition to inherited favorable natural conditions, Vietnam quickly expanded its coffee industry. In 1997, Vietnam surpassed Indonesia to

become the third ranked coffee exporter in the world. Following that, in 2000, with annual export of 734.000 tonnes, Vietnam continued to outperform Colombia and occupied the second place since then (FAO, 2015) for 15 years straight. At the moment, Vietnam made up to 16.38% of world coffee production and took the lead in production of Robusta (Vicofa, USDA, 2014).

Last but not least, it can be seen that Indonesia ranked above India throughout the 30 year period with the average difference of around 400 thousand tonnes. Both of them chose a slow but less fluctuated way of development than the others. Last but not least: Colombia, whose coffee production was nearly as half as that of Brazil (768.600 tonnes), possessed the second highest position in world top coffee producers in 1983. However, Colombia experienced a global change in weather which negatively affected its coffee production, forced it to go down to fourth place at the end of 2013. “Regional climate change associated with global warming has caused Colombian coffee production to decline since 2006 from 12 million 132-pound sacks, the standard measure, to 9 million sacks in 2010. Average temperatures have risen 1 degree Celsius between 1980 to 2010, with average precipitation increasing 25 percent in the last few years, disrupting the specific climatic requirements of the Coffea Arabica bean” (Elizabeth, Rosenthal (March 10, 2011); *The New York Times*).

4.1.4 Production of coffee in Vietnam

Coffee first appeared in Vietnam by the year 1857 through a variety of trading routes. Many researchers believe that it was French who brought these magical brown beans to this land. However, at that time, Vietnam did not have enough resources and money to carry on the development of coffee, nor the strategic vision for turning coffee into a national crucial industry of the future. The scenario of coffee back then was quite bleak and ambiguous. Not until 1884, when French colonials laid domination on Vietnam was coffee’s potential noticed. After many elaborate researches and experiments, Arabica and Robusta coffee was chosen to be grown in many French concessions at Northern provinces. Nevertheless, the result was not as expected. By the year 1930, Vietnamese plantation area for coffee only reached 5.900 hectares. (Vicofa, 2014)

Not until 30 years later did coffee plants receive more concerns from the authority and farmers. During the period from 1960 – 1970, coffee was cultivated on large scale which was estimated to be around 13.000 hectares. By the time Southern liberation event took place in 1975, the total plantation area for coffee was more than 13.000 hectares with 6.000 tonnes of production. After 1975, thanks to a generous capital obtained from signing Intergovernmental Cooperation Agreement with Soviet, Germany, Bulgaria, Czechoslovakia and Poland, Vietnam had sufficient resources to facilitate the development of coffee and converted it into one of the mainstay industries of nation. Receiving encouragement and support from the

authority, the development of coffee industry had taken many vigorous strides. At the end of 1990, the total plantation area for coffee was reported to be up to 119,000 hectares and annual production was 92,000 tonnes (*GSO, Vicofa, 2014*). But not until four years later did the real opportunity arrive so that Vietnam coffee industry could proceed into a new stage. In 1994, Brazil underwent a sudden tragedy: a formidable hoar – frost brought massive destruction to a large proportion of area used for coffee plantation, resulting in a heavy loss in world coffee production. Consequently, prices rocketed due to supply-demand theory, encouraging Vietnamese farmers to expand plantation scale, invest in machinery, equipments and apply intensive farming techniques... hoping to gain market share. During that period, Vietnam still ranked last in the top 5. However, the result paid off quickly: both plantation area and productivity vastly increased at an average rate of 23.9% annually since 1997 (*Vicofa, 2013*). Hence, by the year 2000, Vietnam achieved the total plantation area of 520 thousand hectares and production of 800 thousand tonnes. In 2006, it reached 488.600 hectares (*2006 Annual Statistics, Statistics Publisher*) and the total production marked 1.28 million tonnes, generated 1.899 billion dollars of export revenue (*Hoang Thanh Tiem (2001) "Orientation of Vietnamese Arabica Development in future years", Information of Agriculture – Forest Science and Technology, Agriculture –Forest Science and Technology Institute*). At the moment, Vietnam is occupying the second position in world top coffee producers and first in that of Robusta. Currently, Vietnam coffee production was reported to be around 1.4 million tonnes (*Vicofa, 2014*).

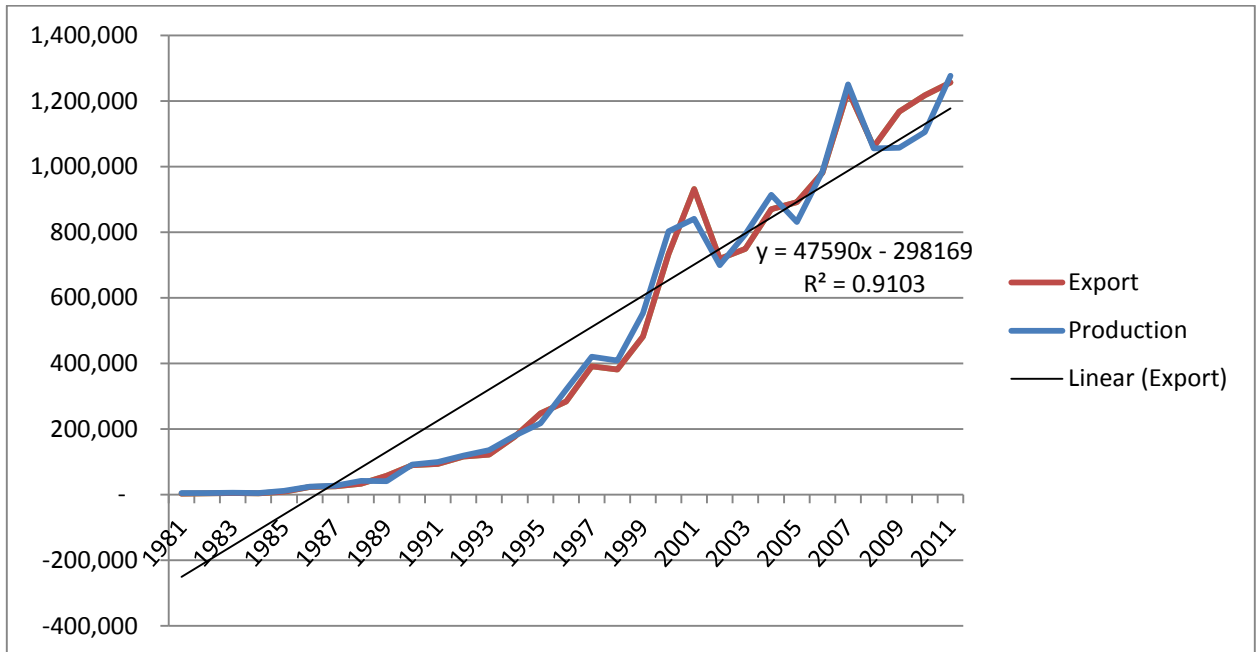
4.2 Export and Domestic Consumption of Coffee in Vietnam

4.2.1 Export and main partners

Along with pepper, cashew, tea and rubber, coffee is one of the strongest exporting commodities that Vietnam possesses. Since 2007, the amount of Vietnamese coffee exported always surpassed one million tonnes, generating average export revenue of 500 million USD for Vietnam annually (*Vicofa, 2014*). In addition, there is a strong connection between coffee producing and exporting activities in Vietnam, since 80 – 90% of coffee produced is used for foreign trades. Thus, it can be said that Vietnamese coffee is meant for export and any investment for the development of coffee production is ultimately meant for the development of coffee export.

As mentioned above, although being the second top coffee producer in the world at the moment, providing around two thirds the amount of coffee which Brazil contributes to global markets (1.2 million tonnes comparing to Brazil's 1.8 million tonnes in 2011) (*FAO, 2015*), Vietnam coffee industry has only been shining for 15 years (since 2000). For better clarification, the author would like to make a summary of Vietnamese coffee export in comparison with the production throughout 30 years, beginning at 1981.

Graph 4.2.1 Vietnamese coffee export and production from 1981 to 2011

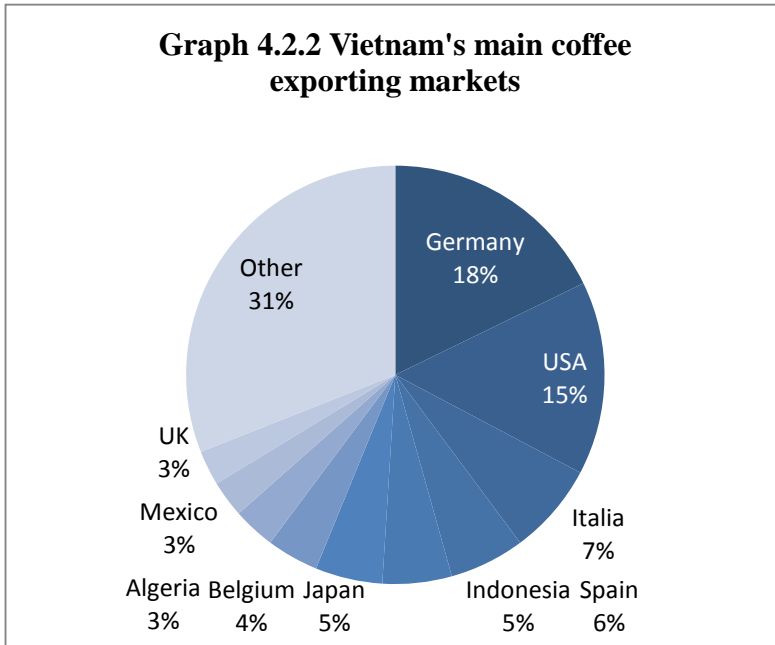


(FAO, 2015)

The above graph illustrates coffee export and production in Vietnam during a 30 year period. As can be seen, both trends sharply went up by more than one million over the duration, reflecting the dramatic growth of the second biggest coffee producer. Moreover, the trends are closely similar, signaling the government’s tendency towards exporting activities rather than domestic consumption. One of the first things to notice is that during the first 5 years, coffee exported from Vietnam was relatively scanty which could barely surpass 10,000 tonnes. After 1985, the industry had taken certain promising steps towards development. During the next 13 years, the quantity of coffee exported had remarkably increased by over 350,000 tonnes and was estimated to be 482,000 tonnes at the end of 1999 (FAO, 2015). Following that, the trend did not stop growing, continued to soar up to 931,198 tonnes in 2001 before experiencing a rough decline in the very next year. Nevertheless, the industry still swiftly got back to its trace and kept expanding the quantity of coffee exported to more than 1.2 million tonnes by the end of 2011, in spite of many fluctuations in domestic production.

Fundamentally, Europe, Asia and Africa are the principle markets importing coffee from Vietnam. In 2013, Europe is still the primary market importing Vietnamese coffee (568,000 tonnes, equivalent to 1.2 billion USD). At the second place, Asia imported around 269,000 tonnes (worth 598.9 million USD). Last but not least, coffee exported to Africa also reached 38.1 thousand tonnes (worth 74.5 million USD). According to statistics acquired from General Department of Vietnam Customs, during 2012, there were 78 countries had their coffee beans

Graph 4.2.2 Vietnam's main coffee exporting markets



Source: Department of Agriculture and Rural Development, 2012

(or proportionally) imported from Vietnam. Moreover, the first top ten countries accounted for 69% of export revenue of this commodity. On top of the list, it was Germany whose importing quantity reached 113,000 tonnes (worth 231.3 million USD). Within a year, Vietnamese coffee exported to this market had increased by 53% both in volume and in value comparing to previous period, making Germany one of Vietnam's most promising coffee importing markets. At the second position, United States also imported 95,000

tonnes (worth 227.9 million USD), although it was standing on top of the list during previous year. In addition, coffee exported to other European markets such as Italia and Spain, who ranked third and fourth on the list, was also quite gloomy. The amount of coffee sold to Italia was merely around 45,000 tonnes (worth 92 million USD), fell 16% in value; while that to Spain was nearly 37,000 tonnes (worth 75.4 million USD), fell 12% in volume and 7% in value. However, the amount of coffee exporting to Asian markets such as Indonesia and Japan, who ranked fifth and sixth on the list, actually went up. More specifically, in 2012, Indonesia was the only market who grew at incredible speed, imported 34,000 tonnes of coffee from Vietnam (worth 68.8 million USD), increased by 750% in volume and 740% in value in comparison to previous period. Japan also imported 33,000 tonnes (worth 75.2 million USD), raised by 50% in volume and 47% in value. Similar to other European markets, the value of coffee imported to Belgium dropped by 64% to 52.2 million USD, comparing to 2011. The 8th and 9th rank belonged to Algeria and Mexico, with the amounts coffee imported from Vietnam were 20,800 tonnes (worth 40.6 million USD) and 18,000 tonnes (worth 35.1 million USD) respectively. The last position came to United Kingdom, whose coffee imported from Vietnam surpassed 35 million USD, increased by 13% in comparison to the last period. This market had a potential to become the main entry for bringing Vietnamese coffee into Europe.

4.2.2 Domestic consumption

Vietnam is an Asian country, sharing plenty of common cultural traits with other nations in the same neighborhood, especially China. One of them is a habit of drinking tea, which has existed for thousands of years. Therefore, although being one of the best coffee producers in the world, Vietnam still has not completely penetrated by Western coffee drinking habit. In fact, according to table 4.2.2, the percentage of coffee consumed by Vietnamese in comparison with the production is extremely low, especially during 2005 – 2010.

Table 4.2.2 Coffee consumption in Vietnam from 2005 to 2010

	2005	2006	2007	2008	2009	2010
Production (Unit: 1000 60kg sacks)	14.500	13.666	19.500	18.333	19.670	17.366
Production (Unit: Tonnes)	870.000	819.960	1.170.000	1.099.980	1.180.200	1.041.960
Consumption (Unit: 1000 60kg sacks)	618	687	858	900	1064	1101
Consumption (Unit: Tonnes)	37.080	41.220	51.480	54.000	63.840	66.060
Percentage of consumption in comparison to production	4.3%	5%	4.4%	4.9%	5.4%	6.4%

(Source: USDA, Vicofa, BMI)

According to Vietnam Coffee and Cocoa Association (Vicofa), by the year 2014, domestic coffee consumption was estimated to be around 100 thousand tonnes (approximately 10% of total production), indicating the remaining 90% were intended for exporting purposes. This was an unpleasant scenario for Vietnamese farmers because they had to be highly dependent on foreign importers. Being over-dependent on foreign trade, farmers might be put in a constant fear of being forced to trade at a low price, of an unstable and unsecured output and sometimes even of the slightest movement of exchange rate. Therefore, by stimulating domestic consumption of coffee, not only shall the reliance on foreign markets be reduced, but the output will also become more certain and secured. Consequently, Vietnamese exporter's position on world coffee markets may be enhanced, carry more weight and respect.

One of the foremost advantages that Vietnamese coffee drinking market possesses is its relatively huge size. In fact, by 2013, Vietnam population was estimated to be 89,708,900 people (*World Bank, 2015*). This is a big advantage for Vietnam that if the country is successful in persuading people to change the culture and adapt with the new habit, purchasing power may be enormous. For example: a variety of Vietnamese enterprises currently involving in coffee business have claimed that, if 20% of the population consume one more cup of coffee (25 grams per cup on average) on daily basis, it will result in an extra 164,000 tonnes of coffee powder are consumed annually, equivalent to 251,000 tonnes of coffee bean (Usually, 1.5 kilograms of coffee beans are required to make 1 kilogram of coffee powder). Comparing to 2013 figures, this extra amount would make up to 17% of national coffee production, raising the total domestic consumption share more than one fourth (27%). As a result, the dependence of domestic exporters upon foreign trade would be remarkably reduced.

4.3 Robusta coffee price of world and Vietnam

Table 4.3.1 Compilation of World and Vietnamese coffee price from 1988 to 2006

Unit: USD/ton

Year	Vietnamese Price of Robusta	World Price of Robusta
1988	1,750	2,080
1989	1,420	1,656
1990	1,030	1,182
1991	820	1,072
1992	790	941
1993	1,340	1,158
1994	1,590	2,621
1995	1,400	2,771
1996	1,539	1,806
1997	1,270	1,736
1998	1,555	1,823
1999	1,213	1,489
2000	681	913
2001	423	607
2002	428	662
2003	644	853
2004	613	828
2005	921	1,000
2006	1,106	1,350

(Source: Department of Agriculture and Rural Development, 2014)

In general, Vietnamese price of Robusta was always lower than that of world during the 18 year period. There was only one exception which took place in 1993, when Vietnamese export price was actually higher than world price (1,340 USD/ton versus 1,158 USD/ton). However, their growing/decreasing trends are basically quite similar and can be divided into three smaller durations: 1988 – 1992, 1993 – 1999 and 2000 – 2006.

The first duration (from 1988 to 1992) indicates the continuous decrease in price of Robusta coffee. More specifically, during this duration, Vietnamese price went down at an average speed of 240 USD/ton/year while world price shrunk at a speed of 285 USD/ton/year. Combining with table 4.1.3, the phenomenon can be explained as a response against the increase in world coffee supply between 1988 and 1992. This is also the time when Colombia expanded their coffee

production at a rapid speed and even peaked out in 1992.

The second duration (from 1993 to 1999) represents a sudden soar in both prices at the beginning of the duration. After one year, the change in Vietnamese price was remarkable (around 550 USD/ton) comparing to a medium change in world price (217 USD/ton). Perhaps there were three reasons for this phenomenon: Firstly, as mentioned above, many Central and South American countries such as Brazil and Colombia suffered from an unexpected hoar – frost which brought massive destruction to 1994 and 1997 coffee production. The sudden plunge in coffee supply along with high demand had made prices to increase. Secondly, because of the disaster, the quality of coffee supplied by these producers might not be as good as that of previous crops, thus consumers shifted to other trustworthy and more valuable market and looked for better coffee supply sources, such as Vietnam. This event caused Vietnamese coffee price rocketed. Last but not least, the not – so – big change in world coffee price after the occurrence of the tragic event could be explained by an existence of private storage. In other words, depending on specific policies and governmental supports, coffee producers or consumers may have stored a certain amount of coffee for private reasons (future production loss, price retention or even as a strategic economical commodity). Hence, when the frost occurred, they were able to maintain the price by releasing their storages. However, by 1994, it quickly became impossible to hold the price against going up. World coffee price soared up by 1,613 USD/ton and peaked out at 2,771 USD/ton within the next year. After 1996, the price fever began to cool down and ended up at a quite reasonable level (1,213 USD/ton for Vietnamese coffee or 1,489 for world coffee).

The sudden heavy drop at the beginning of the last duration (from 2000 to 2006) signaling the recession of coffee industry. It was the consequence of the uncontrollable massive expansion of coffee production throughout the world during 1990s, typically Robusta producers such as Vietnam. Abnormal appealing price had driven Vietnamese farmers to rush into cultivating coffee plants at a rapid speed, soon creating a considerable surplus in world coffee production. Consequently, world coffee price dramatically fell down and for the first time within the last 40 years, eventually bottomed out in 2001 at 607 USD/ton. World coffee price continued to fluctuate under 1000 USD/ton for 5 straight years before regaining its momentum to bounce back. Nevertheless, at the end of the period, both Vietnamese and global coffee price was reported to be above 1,000 USD/ton. At the moment (2015), world coffee price is usually around 2,000 USD/ton (*Vicofa, USDA, 2015*).

4.4 Regression model of production (by using OLS)

Based on the author’s perspective and humble knowledge, there is a connection between Vietnamese coffee production and plantation area, along with productivity, world price and Vietnamese price of Robusta coffee. In another word, production is a function of plantation

area, productivity and 2 types of price. Other factors such as labor, fertilizers and weather conditions are omitted or proportionally included in productivity. By testing step by step, the optimal equation interpreting the production of Vietnamese coffee shall be obtained.

Test 1

Simplified model: Production = function (Plantation Area, Productivity, Vietnamese price of Robusta, World price of Robusta).

Null hypothesis: There is no statistically significant relation between production, plantation area, productivity, Vietnamese price of Robusta and world price of Robusta.

Alternative hypothesis: There is a statistically significant relation between production, plantation area, productivity, Vietnamese price of Robusta and world price of Robusta.

Level of significance (alpha) used in the analysis is 0.1 and 0.05 alternatively. If p – value is equal or less than alpha, null hypothesis will be rejected and alternative hypothesis is accepted.

Model 1: OLS, using observations 1988-2005 (T = 18) **Dependent variable: Production**

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	-147.778	154.924	-0.9539	0.35755	
Plantation Area	1.20918	0.195595	6.1821	0.00003	***
Productivity	184.879	89.128	2.0743	0.05847	*
VNpriceofRobusta	-6.95538	133.534	-0.0521	0.95925	
WorldpriceofRobu sta	-27.3587	80.0448	-0.3418	0.73797	
Mean dependent var	400.7444	S.D. dependent var	307.0061		
Sum squared resid	140613.9	S.E. of regression	104.0022		
R-squared	0.912242	Adjusted R-squared	0.885240		
F(4, 13)	33.78378	P-value(F)	9.38e-07		
Log-likelihood	-106.2115	Akaike criterion	222.4230		
Schwarz criterion	226.8749	Hannan-Quinn	223.0369		
rho	0.280644	Durbin-Watson	1.348876		

The statistics were obtained from Vietnam General Statistics Office, General Department of Customs and Department of Agriculture and Rural Development, analyzed and generated by gretl. The initial equation can be expressed as:

$$y = -147.778 + 1.20918 x_1 + 184.879 x_2 - 6.955 x_3 - 27.359 x_4$$

y : Production (1000 tonnes)

x₁ : Plantation area (1000 ha)

x₂ : Productivity (ton/ha)

x₃ : Vietnamese price of Robusta (1000 USD/ton)

x₄ : World price of Robusta (1000 USD/ton)

The result was quite satisfying. R – squared and Adjusted R – squared figures were high (91.22% and 88.52%), indicating more than 90% of the data were explained by this model. However, as level of significance equals to 0.1, only plantation area and productivity variable, whose p – values were less than alpha, were considered significantly relating to Production. Moreover, as level of significance equals to 0.05, only plantation area variable was accepted, even though p – value of productivity did not significantly exceed alpha (0.058 comparing with 0.05). As the result, Vietnamese price of Robusta and world price of Robusta are excluded during the next test.

Test 2

Simplified model: Production = function (Plantation Area, Productivity).

Null hypothesis: There is no statistically significant relation between production, plantation area and productivity.

Alternative hypothesis: There is a statistically significant relation between between production, plantation area and productivity.

Level of significance (alpha) used in the analysis is 0.05. If p – value is equal or less than alpha, null hypothesis will be rejected and alternative hypothesis is accepted.

Model 2: OLS, using observations 1988-2005 (T = 18)

Dependent variable: Production

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	-213.185	76.2124	-2.7972	0.01353	**
Plantation Area	1.26498	0.165452	7.6456	<0.00001	***
Productivity	186.782	80.0471	2.3334	0.03396	**
Mean dependent var	400.7444	S.D. dependent var		307.0061	
Sum squared resid	145425.8	S.E. of regression		98.46346	
R-squared	0.909239	Adjusted R-squared		0.897138	
F(2, 15)	75.13475	P-value(F)		1.53e-08	

Log-likelihood	-106.5143	Akaike criterion	219.0287
Schwarz criterion	221.6998	Hannan-Quinn	219.3970
rho	0.327211	Durbin-Watson	1.278418

The result was far better than expected. Similar to the first test, R – squared and Adjusted R – squared of the second test were noticeably high (both figures were around 90%), indicating that more than 90% of the data were explained by the model. P – value (F) was reported to be 1.53^{-08} , along with the p – values of variables (including constant) were all less than alpha (0.05), meaning that null hypothesis is rejected and there is a significant relation between production, plantation area and productivity. The final equation can be interpreted as:

$$y = -213.185 + 1.26498 x_1 + 186.782 x_2$$

y : Production (1000 tonnes)

x₁ : Plantation area (1000 ha)

x₂ : Productivity (ton/ha)

According to the equation, for every extra 1,000 hectare of land used for coffee plantation, Vietnamese coffee production increases by 1,265 ton. Similarly, if productivity rises by 1 ton/hectare, Vietnamese coffee production will increase by 186,782 tonnes. In another viewpoint, in order to generate an extra 500,000 tonnes of coffee, either plantation area must increase by 395.26 hectares or productivity must rise by 2.68 tonnes/hectare. This function seems logical and practical. On one hand, it implies that the growth in productivity proves to be more effective since it creates a much higher production comparing to that of plantation area (187 thousand tonnes comparing to 1 thousand tonnes). This is because the current plantation area is huge already (around 500,000 hectares in 2005 and 650,000 hectares in 2014), signaling that an increase in productivity will benefit all plantation area, hence improving the overall production (not just creating an small extra amount of coffee due to an plantation area expansion). On the other hand, however, enhancing productivity seems quite more difficult to execute than expanding plantation area (*Table 6.3 Vietnamese Robusta coffee production, plantation area, productivity, export price and world price*). The reason for this difference was that productivity improvement requires many investments and efforts in cultivation and harvesting processes, while burning down forests (even watershed forest) simply can be done to expand plantation area. This also reflects the fact that for decades, Vietnamese farmers have been trying to expand plantation area, rather than focusing on improving productivity.

Chapter V – Result and Conclusion

As a tropical country, Vietnam possesses many favorable weather conditions suitable for the development of coffee. Thanks to appropriate atmospheres, located at different corresponding regions, both Arabica and Robusta are grown (although Robusta remains the primary target for production and export). 95% of coffee produced in Vietnam is Robusta, concentrated in Tay Nguyen. Annually, this region contributes up to 92% of Vietnam coffee production. The remaining 5% is Arabica, located in Northern provinces with scanty production and plantation area (*Department of Agriculture and Rural Development, 2014*). In recent years, Vietnam's annual coffee produced and exported always surpassed 1 million tonnes. However, although being one of the top coffee exporters in the world, Vietnam still does not gain much from export revenue comparing to other exporters. In fact, in 2014, Vietnamese exported coffee worth merely 3.6 billion USD (*Vicofa, 2015*) while Brazil's worth 6.8 billion USD (*latino.foxnews.com*), although there was not much difference between the amounts of coffee exported of these two countries. It is because Vietnam is still exporting coffee as green beans (up to 95% of coffee production) with just a minor amount of coffee manufactured (One unit of coffee manufactured is triple the value of the green one) (*Vicofa, 2014*). If Vietnam is looking for higher export revenue from trading coffee, it must think of improving domestic coffee processing and manufacturing chains.

Vietnam is an Asian country, sharing plenty of common cultural traits with other nations in the same neighborhood, especially China. One of them is a habit of drinking tea, which has existed for thousands of years. Therefore, although being one of the top coffee producers in the world, Vietnam still has not completely penetrated by Western coffee drinking habit. In fact, domestic coffee consumption was estimated to be approximately 10% of total production (*Vicofa, 2014*). This was an unpleasant scenario for Vietnamese farmers because they had to be highly dependent on foreign importers. Being over-dependent on foreign trade, farmers might be put in a constant fear of being forced to trade at a low price, of an unstable and unsecured output and sometimes even of the slightest movement of exchange rate. Therefore, by stimulating domestic consumption of coffee, not only shall the reliance on foreign markets be reduced, but the output will also become more certain and secured. Consequently, Vietnamese exporter's position on world coffee markets may be enhanced, carry more weight and respect.

In general, Vietnamese price of Robusta was always lower than that of world during the since 1988. This result indicates that the quality of coffee exported is relatively poor and inconsistent, due to the incompetence in harvesting, processing and preserving processes. In order to improve the quality of Vietnamese coffee, the government as well as farmers must

follow IGO's strict standard principals in chains of coffee production and processing. Only when the quality of Vietnamese coffee is improved shall its value increase. Moreover, the 1990s has taught coffee producers around the world a valuable lesson: without a proper system of production control, or lack of governmental orientation, unorganized massive production may once again plunge coffee price into bottom.

In addition, the regression model also states that there was a statistically significant relation between production, productivity and plantation area of Vietnamese Robusta coffee. It can be expressed as:

$$y = -213.185 + 1.26498 x_1 + 186.782 x_2$$

y : Production (*1000 tonnes*)

x_1 : Plantation area (*1000 ha*)

x_2 : Productivity (*ton/ha*)

The model also clarified an idea why Vietnamese farmers, in order to increase production, tend to burn down forests (even if it is watershed forests) to expand plantation area rather than focusing on improving productivity. Expanding plantation area by burning down forests, although is much easier to conduct, does not give many benefits in return. In fact, by demolishing forests, especially watershed forests, rains will not be able to keep uphill, hence creating erosion and more severe draughts. The government should issue more principles, prohibiting this action not only for national coffee industry, but also for the environment.

It is true that coffee play an extremely crucial role in Vietnamese agriculture. On one hand, coffee largely contributes to national export revenue. On the other hand, growing these plants also brings plenty of positive effects to social welfare, under a diversity of actions such as: providing firm jobs for millions of people, being foundation for redistribution and relocation policies, enhancing general living standards (especially in rural/mountainous areas) and indirectly reducing criminal rate in those regions, etc... Recognizing these crucial benefits, Vietnamese authority decided to promote this industry. Thus, numerous preferential tariffs and policies were enacted in order to promote trading activities of coffee, and countless investments and labor force were spent on the development of this industrial crop.

In a nutshell, Vietnam is currently the world second highest coffee producer and the biggest producer of Robusta. It can be said that beside inherited favorable natural potentials, there was clearly an opportunity for Vietnam coffee industry to thrive on during the 1990s and achieved the titles. However, in order to maintain the current position, or to achieve a bigger dream of surpassing Brazil in world coffee supplied, not only should the government pay more efforts and investment on promoting the industry, but farmers must also improve their awareness of the environment and think of long – term goals.

References

Books

- Chapman, G. and Hodges, G. (2011). *Coffee*. Mankato, Minn.: Smart Apple Media.
- Klein, L. (1983). *The economics of supply and demand*. Baltimore, Md.: Johns Hopkins University Press.
- Marshall, C. (1983). *The world coffee trade*. Cambridge [Cambridgeshire]: Woodhead-Faulkner.
- Neilson, J. and Pritchard, B. (2009). *Value chain struggles*. Chichester, U.K.: Wiley-Blackwell.
- Parkin, M. (1990). *Microeconomics*. Reading, Mass.: Addison-Wesley Pub. Co.
- Rothfos, B. (1980). *Coffee production*. Hamburg: Gordian-Max-Rieck.
- Weinberg, B. and Bealer, B. (2001). *The world of caffeine*. New York: Routledge.
- Wrigley, G. (1988). *Coffee*. Harlow, Essex, England: Longman Scientific & Technical.

Scientific Papers

- ECKHARDT, R. (2009). Asia's Best Coffee - Vietnam. *The Wall Street Journal*. [online] Available at: <http://www.wsj.com/articles/SB125739786129330315> [Accessed 10 Feb. 2015].
- Faundez, J. (n.d.). Douglass North's Theory of Institutions: Lessons for Law and Development. *SSRN Journal*.
- Gioannucci, D., Lewin, B., Swinkels, R. and Varangis, P. (n.d.). Socialist Republic of Vietnam Coffee Sector Report. *SSRN Journal*.
- Lacour, (1997). Journal search results - Cite This For Me. *Journal of Vestibular Research*, 7, p.101.
- Naironi, F. (1671). Kaldi (his dancing goats) and the Origin of Coffee. [online] Available at: <http://www.beanabike.com/index.php/2011/11/16/kaldi-and-the-origin-of-coffee/> [Accessed 9 Feb. 2015].
- Ponte, S. (2002). The `Latte Revolution'? Regulation, Markets and Consumption in the Global Coffee Chain. *World Development*, 30(7), pp.1099-1122.

RAEMY, A. and LAMBELET, P. (1982). A calorimetric study of self-heating in coffee and chicory. *International Journal of Food Science & Technology*, 17(4), pp.451-460.

RIOS, A. and SHIVELY, G. (2006). FARM SIZE, IRRIGATION INFRASTRUCTURE, AND THE EFFICIENCY OF COFFEE PRODUCTION IN VIETNAM. *Forests, Trees and Livelihoods*, 16(4), pp.397-412.

Text from web – pages:

Coffeeresearch.org, (n.d.). *Coffee Plant: Arabica and Robusta - CoffeeResearch.org*. [online] Available at: <http://www.coffeeresearch.org/agriculture/coffeeplant.htm> [Accessed 16 Mar. 2015].

Geishacoffee.com, (2015). *The Coffee Process*. [online] Available at: http://www.geishacoffee.com/coffee_process.php [Accessed 12 Jan. 2015].

Government Policies, (2015). *Circular 26/2001/Department of Commerce*. [online] Available at: http://vanban.chinhphu.vn/portal/page/portal/chinhphu/hethongvanban?class_id=1&_page=510&mode=detail&document_id=150205 [Accessed 16 Feb. 2015].

Heirloom Coffee, (n.d.). *An Overview of Vietnamese Coffee*. [online] Available at: http://www.vietnamese-coffee.com/vietnamese_coffee_about.php [Accessed 12 Jan. 2015].

ICO, (n.d.). *World trade of soluble coffee*. [online] Available at: <http://www.ico.org/presents/1213/icc-110-5-soluble.pdf> [Accessed 15 Feb. 2015].

Le, N. (2015). *Coffee Cultivation in Tay Nguyen*. Dak Nong Newspaper.

Thuan, D. (2014). *Coffee Irrigation*. [online] Vietlinh.vn. Available at: http://www.vietlinh.vn/library/agriculture_plantation/caphe_tuoinuoc.asp [Accessed 12 Jan. 2015].

United States Department of Agriculture, (2013). *Coffee: Marketings Forecast Lower but Higher Value Expected for 2012/13 Season*. [online] Available at: http://www.nass.usda.gov/Statistics_by_State/Hawaii/Publications/Sugarcane_and_Specialty_Crops/coffeeFF.pdf [Accessed 9 Jan. 2015].

Viettrade.gov.vn, (2015). *Coffee Plantation Area in Vietnam 2013/14*. [online] Available at: <http://www.viettrade.gov.vn/ca-phe/3548-sn-lng-ca-phe-mua-v-mua-v-201314.html> [Accessed 10 Sep. 2014].

Wikipedia, (n.d.). *Making of Instant Coffee*. [online] Available at: http://en.wikipedia.org/wiki/Instant_coffee [Accessed 15 Feb. 2015].

World Bank Organization, (2015). *Report No. 29358-VN on Government Supporting Policies*. [online] Available at:
<http://siteresources.worldbank.org/INTVIETNAMINVIETNAMESE/Data%20and%20Reference/20646487/coffee0508vie.pdf> [Accessed 16 Jan. 2015].

Gso.gov.vn, (n.d.). *General Statistics Office of Vietnam*. [online] Available at:
<http://www.gso.gov.vn/> [Accessed 16 Mar. 2015].

Mard.gov.vn, (2015). *Department of Agriculture and Rural Development*. [online] Available at: <http://www.mard.gov.vn/> [Accessed 16 Feb. 2015].

pct., B. (2015). *Brazil's revenues from coffee exports*. [online] Fox News Latino. Available at:
<http://latino.foxnews.com/latino/news/2015/02/10/brazil-revenues-from-coffee-exports-increase-535-pct/> [Accessed 16 Mar. 2015].

Vicofa.org.vn, (2015). *Vietnam Coffee and Cocoa Association*. [online] Available at:
<http://www.vicofa.org.vn/> [Accessed 10 Feb. 2015].

Appendices

Table 6.1 World Coffee Production from 1983 to 2013

(Unit: tonnes)

Year	Brazil	Vietnam	Indonesia	Colombia	India	World
1983	1,671,588	5,700	305,648	768,600	130,000	5,582,080
1984	1,420,281	4,800	315,489	807,800	105,029	5,221,504
1985	1,910,646	12,300	311,398	643,100	195,100	5,824,530
1986	1,041,406	25,000	356,822	713,500	122,400	5,237,224
1987	2,202,708	27,500	388,669	651,600	192,100	6,385,156
1988	1,348,014	42,000	391,095	708,700	122,700	5,645,491
1989	1,532,335	40,900	401,048	664,000	214,700	5,908,041
1990	1,464,856	92,000	412,767	845,000	118,100	6,063,096
1991	1,520,382	100,000	428,305	970,740	170,000	6,100,776
1992	1,294,373	119,200	436,930	1,100,000	180,000	6,086,471
1993	1,278,759	136,100	438,868	818,220	162,000	5,553,907
1994	1,307,289	180,000	450,191	721,860	208,000	5,727,857
1995	930,135	218,000	457,801	821,820	180,000	5,532,059
1996	1,369,196	320,100	421,751	671,401	223,000	6,212,939
1997	1,228,513	420,500	426,800	642,239	205,000	5,992,638
1998	1,689,366	409,300	512,165	766,980	228,000	6,633,826
1999	1,631,852	553,200	524,687	546,720	265,000	6,789,530
2000	1,903,562	802,500	554,574	637,140	292,000	7,613,342
2001	1,819,569	840,600	569,234	656,160	301,000	7,389,740
2002	2,649,610	699,500	682,019	696,840	301,000	7,980,954

2003	1,987,074	793,700	663,571	694,080	275,275	7,095,678
2004	2,465,710	913,800	647,385	674,400	270,500	7,918,237
2005	2,140,169	831,000	640,365	667,140	275,500	7,451,701
2006	2,573,368	985,300	682,158	724,740	274,000	8,153,497
2007	2,249,011	1,251,000	676,475	757,080	288,000	8,142,133
2008	2,796,927	1,055,811	698,016	688,680	262,000	8,499,041
2009	2,440,056	1,057,540	682,591	468,720	262,300	7,788,621
2010	2,907,265	1,105,700	684,076	535,380	289,600	8,467,720
2011	2,700,540	1,276,506	638,600	468,540	302,000	8,394,802
2012	3,037,534	1,565,400	691,163	462,000	314,000	9,209,761
2013	2,964,538	1,461,000	698,900	653,160	318,200	8,920,840

(FAOSTAT Date: Sat Feb 14 14:40:27 CET 2015)

Table 6.2 World Coffee Export

(Unit: tonnes)

Year	Vietnam	Brazil	Indonesia	Colombia	India
1981	2,700	825,443	210,595	535,941	81,217
1982	4,200	888,023	226,985	525,183	77,801
1983	4,600	939,671	241,223	539,452	67,400
1984	4,100	1,031,895	294,463	598,895	61,675
1985	9,200	1,033,611	282,671	585,285	96,687
1986	24,021	477,907	298,124	666,645	77,487
1987	25,593	987,609	286,247	661,631	88,333
1988	33,502	904,357	298,858	567,726	81,460
1989	57,415	943,374	356,961	628,631	122,800
1990	89,583	853,230	421,627	811,423	82,961

1991	93,500	1,094,694	380,122	740,139	88,796
1992	116,175	1,017,642	269,176	967,536	107,654
1993	122,000	964,153	348,984	784,585	111,043
1994	176,400	871,018	288,958	673,399	120,574
1995	248,100	721,305	230,066	558,745	143,795
1996	283,700	777,909	366,473	600,026	146,772
1997	391,630	868,439	312,960	617,102	136,183
1998	382,000	995,212	356,904	636,753	179,605
1999	482,000	1,271,772	351,047	568,469	175,830
2000	733,900	967,042	337,600	508,399	161,508
2001	931,198	1,252,217	249,202	559,988	150,943
2002	718,575	1,551,410	322,758	578,846	164,689
2003	749,200	1,369,159	321,180	578,149	167,495
2004	869,832	1,410,801	339,880	574,935	140,613
2005	892,000	1,352,097	443,366	616,380	157,208
2006	981,000	1,475,716	411,721	600,724	188,058
2007	1,232,100	1,488,255	320,600	637,421	152,610
2008	1,060,884	1,566,921	468,019	602,879	149,624
2009	1,168,000	1,639,392	510,189	457,728	126,330
2010	1,217,868	1,791,064	432,781	410,493	177,926
2011	1,256,400	1,791,207	346,092	433,646	231,087

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Table 6.3 Vietnamese Robusta coffee production, plantation area, productivity, export price and world price.

Year	Production	Plantation Area	Productivity	Vietnamese price of Robusta	World price of Robusta
<i>Unit</i>	<i>1000 tonnes</i>	<i>1000 ha</i>	<i>ton/ha</i>	<i>1000 USD/tonne</i>	<i>1000 USD/ton</i>
1988	42	112	0.280	1.750	2.080
1989	41	123	0.332	1.420	1.656
1990	92	119	0.771	1.030	1.182
1991	100	115	0.869	0.820	1.072
1992	119	104	1.149	0.790	0.941
1993	136	101	1.344	1.340	1.158
1994	180	124	1.453	1.590	2.621
1995	218	186	1.170	1.400	2.771
1996	320	254	1.247	1.539	1.806
1997	421	340	1.236	1.270	1.736
1998	409	371	1.153	1.555	1.823
1999	553	478	1.158	1.213	1.489
2000	503	562	1.428	0.681	0.913
2001	841	565	1.488	0.423	0.607
2002	700	536	1.450	0.428	0.662
2003	794	514	1.501	0.644	0.853
2004	914	503	1.659	0.613	0.828
2005	832	491	1.562	0.921	1.000

(Vietnam General Statistics Office, General Department of Customs and Department of Agriculture and Rural Development)