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THE IMPACT OF BIRD FLU ON THE ECONOMY: CGE MODEL APPROACH (COMPUTABLE GENERAL EQUILIBRIUM MODEL)

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ABSTRACT

The negative impact of the outbreak of bird flu on economic sectors in the partial and macro research will be analyzed using CGE models (Computable General Equilibrium). The result of the simulation studies indicate that the sector directly affected by the outbreak of bird flu poultry sectors are a traditional, medium large poultry meat and eggs. While the sectors that are indirectly affected sectors are rice, corn, soybean ad agricultural, other livestock, paper industry, fertilizer industry, chemical industry, pharmacy, restaurant and services. Next the result of the simulation showed that the decrease in the production of poultry meat sector (traditional and medium-large) and egg sectors impact on the micro and macro aspects of the economy. On the micro level in domestic market there are decreased production and increased prices in the poultry sector, eggs, other farms, restaurants and services. While in the foreign market there are decreased exports as well as imports.Furthermore, there is a decline in consumption by the entire group of household due to a decline in the acceptance by all groups of households and firms. Government revenue also declined due to a decrease in taxes from households and firms. So it can be said there are a decline in the income of households and the government. At the macro level there are a decline in GDP and a decline in the investment. There are no change in the price of capital and labor. Similarly, the interest rate and the inflation rate are fixed.

Keywords: Avian influenza, Poultry, Sectors, Impact, Productivity, Decline.

1. CHAPTER I

1.1. Background

Outbreak of bird flu disease not only cause high mortality in poultry but also cause a wide variety of economic loss, i.e. a decline in productivity in the share of economic sectors , especially sectors that are directly related to the poultry sector, poultry meat(traditionally and medium - large). The negative impact is also suffered by industries indirectly related to the poultry industry, ie restaurant, tourism, trade and transportation sectors.

The negative impact of the bird flu outbreak on partial and macro economy in this study will be analyzed using the Computable General Equilibrium (CGE), which involves a number of simultaneous equations. Simulations performed using SAM database 2008 and a number of sectors are aggregated. Research on the simulation results , the decrease in the production of poultry meat sector (traditional and medium - large) and egg sectors , shows that the sector is directly affected by the bird flu outbreak is the traditional sector, poultry meat , poultry meat and eggs medium - large . While the sector is not directly affected sectors are rice, corn, soybeans, other agriculture, other livestock, paper industry, fertilizer industry , chemical industry , pharmaceutical industry , restaurant and hospitality. Next the results of the simulation showed that the decrease in the production of poultry meat sector (traditional and medium - large) and egg sectors impact on micro and macro- economic aspects. Micro level in domestic market decreased production and increased prices in the sector, poultry, eggs, other livestock, restaurant and hospitality. While there is a decrease in the foreign market as well as import and export. It is also a decline in consumption by the entire group of households due to a decline acceptance by all groups of households and corporate institutions. Government revenue also decreased due to a decrease in taxes from households and firms. So it can be said to be a decline in household income and government groups. At the macro level, a decline in GDP, the decline in investment, there is no change in the price of capital and labor. Similarly, the interest rate and the inflation rate is fixed.

In general, CGE models contain equations , exogenous variables and parameters , and the endogenous variables forms the function of equation (Sadoulet and de Janvry, 1992) . Equations that make up the CGE models are usually grouped into blocks of equations such as block production, consumption block, block export - import, investment block, and block market clearing. The research was carried out within the scope of the national (Indonesian) to examine the impact of bird flu on socio- economic aspects includingpartial, macroeconomic and poverty.

Basically this study will focus on two things: (1) the impact of the outbreak of bird flu virus related sectors as well as the direct and indirect economic performance macro, (2) the impact of measures taken by the Indonesian government in order to cope with bird flu-related sectors as well as direct and indirect macroeconomic performance. Reason CGE modeling approach used in the case of bird flu is that CGE models are generally used to evaluate the relative effective economic impact of a policy. Government policy in this regard is the policy in order to prevent the spread of bird flu and its negative impact on almost all sectors of the economy. This study is a multi-sectors and inter-related to each other. Therefore the most appropriate approach to use in describing the impact of bird flu and the government's policy is to use a general equilibrium approach than partial equilibrium approach.

1.2. Research Questions

Formulation of the problem in the study is as follows:

What is the impact of bird flu on the economy, particularly on growth economic and household income?

2. CHAPTER II

2.1. Literature Review

General equilibrium theory discussed in literature sharing economy , but in essence the general equilibrium theory is a theory that explains the existence of the market as a system in an economy consisting of several kinds of markets (market input and output markets) that have a connection between one market to other markets . Given this linkage, so any change in the market will affect the performance of other markets. General equilibrium model is all the price and quantity of goods in all markets simultaneously determined through a process of interaction with one another (Lewis, 1991). Therefore, the impact of a more precise policy analysis based on the theory of general equilibrium compared to partial equilibrium theory. General equilibrium occurs when supply and demand in each market within the system is in equilibrium simultaneously. True equilibrium price level is the solution of the system of simultaneous equations that describe the behavior of all economic agents in each market and balance.

According to the theory of general equilibrium , where the equilibrium disturbances causing imbalance (disequilibrium) on the market , it will be followed by adjustments in the relevant market and the subsequent adjustment process occurs in other markets (simultaneous adjustment) which brings the overall economy back in shape new balance . This applies to changes in the balance of producers and consumers. Common uses Walras equilibrium assumption, i.e. suppose there are n markets, and if n - 1 market is in equilibrium, and then all n the market will be in equilibrium. Walras proving the existence of general equilibrium is done by using formal mathematics. Walras concluded that a number n excess demand function does not depend on other functions. The total excess demand occurs in all types of goods or commodities produced (Nicholson, 1994) . If the value of all commodities offered in the same market with the value of the requested commodities in the market , while the prices (in this case the relative price) is known in the market as to n - 1 there is a balance , then the rest of the market that there will be a balance as well . CGE model describes the agents and the behavior of economic actors , so as to bring the different markets into a balance (Judge 2004) . In the CGE model formulation; there are linkages between economic actors, i.e. firms or industries, households, investors, governments, importers, exporters and between different commodity markets. The whole market is in a state of balance and have a specific structure to achieve a balance where there is shock in one market (Oktaviani, 2001).

2.2. Basic Concepts CGE Model

In the standard CGE models have explained all the payments the same as those listed in the matrix SAM. CGE models are the standard simultaneous equations are non-linear. Each equation describes the treatment for different actors. At one part, using a simple rule with fixed coefficients. For production and consumption decisions used non-linear equations. The decision to produce is determined by profit maximization, while the decision to consume is determined by utility maximization. CGE models provide a comprehensive macroeconomic framework to explain the

market-oriented economy. Where there are three components, namely consumers, producers and the market.

Assumed that the demand for primary inputs is only two, namely labor and capital, which is the function, used CES (Constant Elasticity of Substitution). Similarly, the value added production functions and input intermediate using CES functions. It is assumed that the government imposes indirect taxes on goods production. The government's tax revenue is spent for public purposes and savings. Government spends on commodity revenues proportionately, where it can reduces savings. One also needs to pay attention to the domestic market and foreign market where it is heavily influenced by export prices and import prices, where the price is often both a source of exogenous variables (determined by the other party)

2.3. Previous Research Regarding the CGE Model

Some previous studies of avian flu has been done both by researchers such as Oktaviani (2008). The negative impact of bird flu has also been investigated by Oktaviani (2008). The model used is a combination of models and PUPPET INDOF. Results of this study concluded that the contribution of the poultry sector in the Indonesian economy is not very significant, but the decrease in output experienced by sectors related to the poultry sector simultaneously negative impact on economic growth. It is evident from the decline in the value of real GDP in all the simulations. Bird flu triggers inflation so that views of the GDP from the expenditure side, household consumption has decreased in all simulations. Inflation will also cause product Indonesian competitiveness in the international market has dropped so it is not surprising if the value of Indonesia's exports also declined. Furthermore, the decline in competitiveness will also cause an increase in imports. The combination of falling exports and rising imports will lead Indonesia's trade balance deficit. Further away from the Greener and Liu (1993), Arndt and Tarp (2000) and Jensen and Tarp (2002)explains that CGE models can be used to review the agricultural trade policies in particular developing countries. CGE could be used to analyze the macro and micro aspects in particular on the distribution of income and household behavior (Benjamin 1996; Philippidis and Hubbard, 2005) . This study uses a dynamic CGE and macro analysis and seems the economic aspects micro. Among its conclusions was decreased 40 per cent of chicken meat demand led to a decline of more than 40 percent decline in domestic production. The amount of imports would also fall if a negative response to the very strong case in particular with regard to the demand of domestic chicken then the price will go up to the conditions of demand and a rise in the consumption of chicken substitute foods such as corn and soybeans, so the decline in demand for chicken will give increased production and profits at producers corn, soybeans and other foods.

3. CHAPTER III

3.1. Research Objectives

The general objective of this study is to analyze and see how big the impact of bird flu on the national economy and the welfare of society. Specific objectives to be achieved are:

1) Identify economic sectors affected directly and indirectly from the bird flu outbreak.
2) Analyzing the impact of bird flu on the economy, particularly on economic growth, employment and household income.
3) Analyze the impact of policies that have been implemented by the government in order to deal with cases of bird flu on the economy as a whole.

3.2. Benefits of Research

This research is expected to contribute to the direction of local and central government policies, particularly those relating to the impact of bird flu on environmental, economic and social. It can also be used as a reference and comparison study for further research. Of the final results of this study can be learned on the economic impact of bird flu and Indonesian society, so that people can learn to be more vigilant and anticipate the symptoms of bird flu outbreak in the future , considering the case of a bird flu pandemic could happen over and over.

3.3. The Scope

The static nature of research can answer the conditions of short term and long term. In the short term conditions, capital and employment are not mobile. While in the long term conditions, capital and employment are mobile. This study is a static and long term impact of bird flu and focus on macro and micro economic performance (every sector). At the micro level, there are several sectors which affected both directly and indirectly. Sectors directly affected sectors such as livestock, meat and poultry slaughterhouses. While the sectors that are not directly related as animal feed ingredients (rice, corn and soybean), trade, restaurant, hospitality, industrial chemicals, pharmaceuticals and transportation.

4. CHAPTER IV

4.1. Data Collection

Research uses secondary data. The study was conducted with a national scope that includes all sectors of the national economy sectors that are exposed in the Social Accounting Matrix table 2008. Secondary data used is Input- Output (IO) in 2008 and Table of Social Accounting Matrix in 2008. SAM is a model that records all economic transactions between economic actors, especially transactions between institutions production activities (including household) and the owners of factors of production in the economy. All data can be obtained from the Indonesian Statistical Bureau.

4.2. CGE Method to Analyze the Impact of Bird Flu

The second method is used to analyze the micro and macro impact of bird flu cases are general equilibrium model that is commonly known as the CGE model (Computable General Equilibrium). CGE model consists of equations of mathematical equations where it is a system of simultaneous nonlinear equations equation (Lofgren *et al.*, 2002). CGE models can simulate the functioning of

markets that are in the economy, including the labor market, capital markets, and commodity markets, as well as providing a very useful perspective on the changes happening in the economy through price and market. Because of the structural nature of CGE models, this model can accommodate a variety of new phenomena, such as bird flu cases. By using software General Algebraic Modeling System (GAMS) will be able to simulate the real impact of the outbreak of bird flu and the effects of policies that have been taken by the government on the economy as a whole.

This study will use a CGE model of Hans Lofgren, where there are four blocks namely: block price, production and trade block, institution block, block constraint system.

i) Price block; which consists of Equality price (endogenous) relating to the price of the price of other (endogenous and exogenous) as well as non- price variables to another.

ii) Production and trade block; this block describes similarities in the structure and behavior of the production sector.

iii) Institution block; this block of equations describing the behavior of households and other institutions such as government and corporate.

iv) System constraint block; this block shows the equation in balance for the labor market, as well as goods and services national balance of payments

4.3. Research Hypothesis

1) Those sectors which are closely related to the poultry sector received the largest negative impact on the bird flu outbreak, especially poultry sectors that use inputs in the production process.

2) Decline in the poultry sector productivity have a negative impact on those sectors which are closely related to the poultry sector. There is a decline in output, followed by price increases in those sectors which are closely related. Resulting in decreased demand for output as a result of declining household income, subsequently the government revenue also declined.

4.4. Framework Analysis

Framework of thought or analysis (Figure 1) is developed in this study are as follows : The spread of bird flu virus that became a pandemic clear impact on the economy at large, so it is important to do research on their impact on the economic performance of micro (sectors and income distribution) and macroeconomic Indonesia. Using the Computable General Equilibrium model this study triesto know the impact of the outbreak of the bird flu virus as well as government policy towards sectors and macro economics. Macro aspects that will be assessed are some macro indicators such as economic growth, incomes and employment.

5. CHAPTER V

5.1. Results and Discussion

The impact of the outbreak of bird flu among poultry led to a broad range of economic losses, such as a decline in the productivity of economic sectors, particularly the poultry sector and those

sectors which are closely related to the poultry sector, including the restaurant sector, hospitality and pharmaceutical, chemical, other livestock, as well feed industry where the raw material is corn, rice and soybeans. Several previous studies have suggested that the poultry and eggs sector productivity by 10 percent. Decline in productivity is of course an impact on other sectors either closely related or not, although it is possible there are other sectors have increased due to an increase in demand at the output of the sector, but not related to the poultry sector. Decline in productivity due to the high mortality rate of birds caused the number of production also declined. In addition, the demand for poultry and eggs also decreased because people experiencing psychological fear to consume poultry products. So to say the decline in output caused by the production and by the decline in demand by the public. Next to the decline in the supply of goods in the market it will affect the price of the goods. The price of goods to be the next up and will reduce the level of public demand for such goods. This will reduce demand for factors of production, namely labor and capital (labor and capital). Decline in demand for labor and capital will lower the price of the input. Ultimately it will lower household income groups as owners of factors of production. Then the aggregate income of a group of households has decreased.

Changes in the income structure of the group will affect the composition of household consumption of goods and services. Cconsumption of goods and services by many groups of households that experienced an increase in income will increase the demand , otherwise the goods are consumed by groups of households that experienced a decline in income will decrease the demand . The size of the impact of changes in the level of income depends on the value of the goods the income elasticity goods. In the end the least of goods consumed by household groups showed decreased their welfare. Vice versa, increasing the goods consumed by the community showed their welfare increased.

In this study suggests poultry sector has extensive linkages with economic foundations. Changes in productivity in the poultry sector directly affects the total output of various sectors, both would have increased and decreased. This change will affect the price of poultry products and some other sectors. Next it will be followed by changes in the demand for poultry products and eggs and other products. Other sectors are also affected export sectors and import of poultry products, which will have an effect on government revenue. But government revenues are also affected by tax revenues.

Decline in productivity will also intermediate inputs used effects and subsequent demand will also affect the amount of the composite commodity for domestic and import. The amount of goods sold in the domestic as well as the amount of imported goods will change. Will ultimately affect the aggregate output sold in the domestic and the next will also affect how the amount to be sold outside the country (in exports).

5.1.1. CGE Simulation Results

According the earlier discussion that the study was conducted with two simulations with the loss of 10 percent in the first simulation and production growth around 10 percent along with the

implementation of government development policy in the second simulation. Discussion of the two simulations will be given in section separately. Simulation of phase two will be presented in the second year of research.

5.2. Micro Aspects (Sectors)

5.2.1. Decrease Productivity Impact

Decline in productivity in the poultry and egg sectors affect on the quantity of output that sector and other sectors concerned. Simultaneous output of almost all sectors has decreased because of the high mortality rate of birds in a short time given the relatively rapid and deadly disease in poultry in large quantities. It can be observed that due to the bird flu attack effect on the overall economy. The magnitude of the change depends on the size of the sector conducted simulation figures. This is illustrated in Table 1. Traditional poultry meat sector, eggs and poultry meat medium - large relatively large decrease is respectively 8.33 percent, 7.16 percent, 5.99 percent. Then it followed by the hospitality sector 3.23 per cent, 3.19 per cent of the top 2.05 percent and other livestock. Poultry sector is closely related to the tertiary sector (restaurants and hospitality services) because the two sectors are using poultry sector input. Because the restaurant and hospitality services sector has decreased , where the two sectors is closely related to the culinary and catering services , then this also affect the tourism sector in Indonesia , also declined.

Table-1. Each change of Total Sector Output and Output Price (%) due to decrease in productivity by 10percent

Sectors	Change of output	Change of price
Rice, corn and soybean	-1,888	-0,145
Other food crops	-1,781	-0,126
Other agricultural Crops	-1,318	-0,752
Poultry meat(traditional farms)	-8,331	13,901
Poultry meat(medium and large farms)	-5,985	16,492
Eggs	-7,158	15,309
Livestock and other results	-2,049	0,746
Forestry and Hunting	-0,265	-1,291
Fishery	-0,623	-2,56
Coal Mining, Metals and Oil Seeds	-0,033	-1,029
Mining and Quarry	-0,208	-0,505
Rice	-1,461	-0,643
Animal food	-1,461	-0,643
Other food industry	-1,461	-0,643
Spinning Industry, Textile, Clothing and Leather	-1,567	-0,672
Industrial Goods Wood & Wood	-0,476	-0,706
Paper Industry, Printing, Equipment and Items from Metal and other Industries	-0,567	-0,789
Chemical industry	-1,039	-1,233
Pharmacy	-1,007	-1,216

Continue

Fertilizer industry, the result of clay, cement	-0,504	-0,95
Electricity, Gas and Water Supply	-0,548	-2,424
Construction	-0,064	-0,591
Trade	-1,309	-0,508
Restaurant	-3,227	1,597
Hotels	-3,185	-0,372
Land Transport	-1,191	-0,615
Air Transport, Water and Communications	-0,884	-0,997
Services Allied to Transport and Warehousing	-1,193	-0,575
Bank and Insurance	-0,851	-1,321
Real Estate and Business Services	-0,666	-1,246
Administration and defense, Education, Health, Movies and Other Social Services	-1,227	-0,1
Individual services	-1,009	-0,695

Source: Data managed

Simultaneously, other sectors also decreased the rice sector, animal feed, other food industries, pharmaceutical, chemical and trade. So a decrease in the production of poultry meat and eggs sector led to a decline in output in all sectors. This is understandable because the poultry sector, both traditional and medium -scale sector requires the output of the rice sector, animal feed, other food industries, pharmaceutical, chemical and trade. When a decline in poultry production, so the demand for the output of these sectors also declined. Due to the declining demand in general price of the output of various sectors has decreased, but the sector poultry, eggs and other livestock, the price increases. This is understandable because the decline in poultry production output means there is a scarcity of poultry sector, where it can trigger a rise in price of the relevant sectors.

Based on Table 1, the poultry meat sector, traditional as well as large and medium egg price increases relatively high at 13.90 percent, 16.49 percent and 15.31 percent. This is a logical consequence of the reduced offer of poultry meat and eggs in the market, causing the price of three sector output increased. Besides, it offers a greater percentage decline than the decline in demand, so prices remain elevated. Similarly, other livestock sectors have increased in price by 0.74 percent due to a decreased supply. The same thing happened in the restaurant sector, price increases of 1.59 percent of the initial price. This is because the restaurant sector using the input of poultry, eggs and other livestock are also experiencing price increases.

Table-2. Changes in Demand Domestically

Sectors	**Change(%)**
Rice, corn and soybean	-1,669
Other food crops	-1,78
Other agricultural Crops	-1,306
Poultry meat(traditional farms)	-7,528
Poultry meat(medium and large farms)	-5,973
Eggs	-7,139
Livestock and other results	-2,047

Continue

Forestry and Hunting	-0,28
Fishery	-0,65
Coal Mining, Metals and Oil Seeds	-0,466
Mining and Quarry	-0,071
Rice	-1,461
Animal food	-1,461
Other food industry	-1,46
Spinning Industry, Textile, Clothing and Leather	-1,454
Industrial Goods Wood & Wood	-0,447
Paper Industry, Printing, Equipment and Items from Metal and other Industries	-0,557
Chemical industry	-1,141
Pharmacy	-1,149
Fertilizer industry, the result of clay, cement	-0,773
Electricity, Gas and Water Supply	-0,548
Construction	-0,064
Trade	-1,309
Restaurant	-3,015
Hotels	-1,422
Land Transport	-1,189
Air Transport, Water and Communications	-1,003
Services Allied to Transport and Warehousing	-1,075
Bank and Insurance	-0,891
Real Estate and Business Services	-0,825
Administration and defense, Education, Health, Movies and Other Social Services	-1,167

Source: Data managed

Table 3, explains that the labor demand for poultry and eggs sector increased primarily due to an increase in prices of poultry meat and egg sectors. This is because when there is a decrease in productivity by 10 percent, while maintaining the same output, there will be an increase in the amount of labor required.

Table-3. Labour demand changes(%)

Sectors	**Change of demand of labor**
Rice, corn and soybean	-1,835
Other food crops	-1,725
Other agricultural Crops	-1,424
Poultry meat(traditional farms)	2,645
Poultry meat(medium and large farms)	4,79
Eggs	3,80
Livestock and other results	-1,022
Forestry and Hunting	-0,467
Fishery	-0,963
Coal Mining, Metals and Oil Seeds	-0,237
Mining and Quarry	-0,337
Rice	-2,514

Continue

Animal food	-2,513
Other food industry	-2,513
Spinning Industry, Textile, Clothing and Leather	-2,677
Industrial Goods, Wood	-1,218
Paper Industry, Printing, Equipment and Items from Metal and other Industries	-1,494
Chemical industry	-2,769
Pharmacy	-2,703
Fertilizer industry, the result of clay, cement	- 1,677
Electricity, Gas and Water Supply	-0,735
Construction	-0,6
Trade	-1,74
Restaurant	-2,432
Hotels	-4,942
Land Transport	-1,714
Air Transport, Water and Communications	-2,202
Services Allied to transport and Warehousing	-1,741
Bank and Insurance	-2,569
Real Estate and Business Services	-2,353
Administration and defense, Education, Health, Movies and Other Social Services	-1,383
Individual services	-1,79

Source: Data managed

It can be concluded that almost all sectors declined except labor demand of poultry meat and eggs sector, has increased the demand for labor.Table 4 shows all the groups household income decreased without exception. It also illustrates that the decline in the productivity of poultry and eggs sector indirectly lead to acceptance of all households fall including both revenue derived from the production factors labor and capital. This is due to the relatively large number of sectors decreased production factor labor demand, since in general the price of labor and capital also decreased. The average revenue of the production factors labor decreased by 1,489 percent while decreasing revenue from the production factor capital by 1,547 percent. Likewise, the company's revenue from the production factor capital has decreased, caused by the same thing that the aggregate price of factors of production has decreased.

Table-4. Institutional changes in income due to reduction of Factor Productivity

	Revenue change (%)
HH-1.labour	-1,489
HH-1.capital	-1,547
HH-2.labour	-1,489
HH-2.capital	-1,547
HH-3.labour	-1,489
HH-3.capital	-1,547
HH-4.labour	-1,489
HH-4.capital	-1,547

Continue

HH-5.labour	-1,489
HH-5.capital	-1,547
HH-6.labour	-1,489
HH-6.capital	-1,547
HH-7.labour	-1,489
HH-7.capital	-1,547
HH-8.labour	-1,489
HH-8.capital	-1,547
ENTR. Capital	-1,547

Source: Data managed

Table 5 Income institutions (domestic non-gov) explain that the acceptance of the whole group of households has decreased without exception. Similarly, the company experienced a decrease in revenues of 2.43 percent. The decrease in revenue is due to the income from the proceeds of the factors of production has decreased. It can be concluded that the decrease in the production of poultry meat and eggs sector by 10 per cent led to the welfare of the entire group of households and firms has decreased. Decline in average household income of below 2 percent.

Table-5. Institutional changes in income (domnon-gov.)

	change (%)
HH-1(agricultural)	-1,292
HH-2(agric. business)	-1,481
HH-3(non agric.,low level)	-1,463
HH-4 (non agric.,town, nonlabor)	-1,452
HH-5 (agric.,town, high level)	-1,731
HH-6 (non agric., city, low level)	-1,621
HH-7(non agric., city,non labor)	-1,655
HH-8(non agric.,city, high level)	-1,695
ENTR	-2,426

Source:data managed

It is interesting to note is the decline in the consumption sector, poultry, eggs and other farm households by the entire group was relatively higher than the decline in consumption in other sectors. Reduction in the consumption of poultry and egg sectorsoccured an average of fewer than 14 percent, while the decline in consumption to other livestock sectors has decreased an average of below 2 percent. Decrease in consumption by households can be understood because of their overall revenue also declined, as well as the availability of the decline.

Table-6. The change of government income.

Base	**SIM01**	**SIM01 (%)**
118,829	117,673	-0,973

Data managed

Table 6 illustrates the change in total government revenue due to decreased production of poultry and eggs sector. In principle, the government is determined by the amount of income tax revenue directly from the institution, direct taxation of factors of production, value added tax, tax activities, import tariffs, export taxes, sales taxes, income from factors and transfers from abroad. But the government is the biggest revenue from income tax. In this condition the entire group of household income declined, including revenue, the income tax revenue from households and firms that received government decreased by 0.97 percent.

5.2.2. Decrease Productivity Impact on Exports and Imports

Discussing foreign markets means closely related to aspects of export and import. The aspects closely related to the export supply side are heavily influenced by export prices and import prices, which often become both the price of the exogenous variables (determined by the other party). Total output in the table mentioned earlier can be seen that almost all sectors experienced a decline in production. The output supply will determine the amount of output to be exported.

The increase or decrease in exports associated with the export price and availability in the country, namely changes in domestic production and domestic demand as well as demand for intermediate input sectors or companies. The import aspects related to the amount of goods required in the country, as it also depends on the ratio between the prices of imports with import prices baseline. If the price of imports fell to the baseline price then there is a tendency in the amount of goods imported a growing trend, but it still takes into account the import tariff, import tariffs are relatively high if the people will choose domestic goods cheaper.

Table 8 explains that the simulated one (decreased production of poultry and eggs) all sectors experienced a decrease of 0.788 percent and international export prices are exogenous. Whereas if you pay attention to the quantity of the export table, it seems clear that the sector of poultry, eggs and other farm export quantity decreased, this is due to a decline in export prices. If looked at from the point of the decline in domestic producer prices decline in exports will encourage the production of goods to be exported

Table-7. Change in Export (%)

	(%)
Rice, corn and soybean	-2,299
Other food crops	-2,205
Other agricultural Crops	-1,341
Poultry meat(traditional farms)	-17,349
Poultry meat(medium and large farms)	-15,303
Eggs	-17,058
Livestock and other results	-2,723
Forestry and Hunting	0,066
Fishery	0,548
Coal Mining, Metals and Oil Seeds	0,125
Mining and Quarry	-0,421

Continue

Rice	-1,555
Animal food	-1,555
Other food industry	-1,554
Spinning Industry, Textile, Clothing and Leather	-1,653
Industrial Goods Wood & Wood	-0,529
Paper Industry, Printing, Equipment and Items from Metal and other Industries	-0,567
Chemical industry	-0,839
Pharmacy	-0,728
Fertilizer industry, the result clay, cement	-0,39
Electricity, Gas and Water Supply	-4,71
Construction	-3,448
Trade	-1,32
Restaurant	-0,748
Hotels	-1,351
Land Transport	-0,61
Air Transport, Water and Communications	-0,367
Services Allied to Transport and Warehousing	-1,67
Bank and Insurance	-1,069
Real Estate and Business Services	-1.60
Administration and defense, Education, Health, Movies and Other Social Services	-0.068

Source: data managed

However, there are some sectors that experienced an increase in the export sector, forestry, fisheries and mining. These three sectors have no connection with the poultry sector and the changes are relatively small so that we can ignore it. Discuss the import aspect is closely related to the amount of goods demanded in domestic (domestic). As noted earlier, the amount of imports it also depends on the ratio between the price of imports with import prices baseline. If the price of imports fell to the baseline price then there is a tendency in the number of imported goods will tend to decline. The table shows the decline in import prices for all sectors. This happens because the demand for domestic goods has decreased as a result of a decline in income across household groups. More than the change in household income decline (over 1 percent) is relatively larger than the decline in import prices changes (below 1 percent).

The quantity of imported goods indicates that there is a decrease in nearly all sectors. But the poultry meat sector imports increased by 3.62 percent. This is because domestic poultry output is relatively large decrease due to lower production of poultry meat by 10 percent. While domestic demand for domestic output decreased output is smaller than the decline in production, therefore, to cover demand for domestic output of poultry meat import needs of the sector. While prices for the domestic poultry sector has increased and import prices decline, both of these things to encourage increased import poultry meat and restaurant sectors, respectively at 3.62 percent and 1.53 percent. Similarly, other mining and quarrying sector increased by 1.71 percent imports , this is because the poultry sector using input from the sector (based on F) so that when the import of poultry meat

increased , the mining and quarrying sector also increased . While other sectors although imports decreased import prices declined due to decreased purchasing power due to declining revenue.

5.2.3. Decrease Productivity impact at the Macro Economic Aspects

Total absorption is determined by the amount of household consumption, government consumption and investment as well as changes in the stock. The simulation of the (reduced productivity of poultry and eggs) absorption total decreased by 1.5 percent. It can be seen from Table 8 of the GDP (Gross Domestic Product). Absorption decrease of 1.5 percent is the average of private consumption, investment and government consumption.

Table-8. GDP and national account

	BASE	IM01	SIM01 %
Absorbstion	5162,691	5084,881	-1,507
Private consumtion	3318,105	3250,314	-2,043
Investment	1508,831	1499,972	-0,587
Gov.cons.	335,756	334,595	-0,346
Eksport	1487,238	1463,997	-1,563
Import	-1347,76	-1325,61	-1,643
GDP	5302,173	5223,264	-1,488
Non direct tax	145,238	143,873	-0,940

Data managed

Exports showed a decline of 1.56 per cent, while imports showed a decrease of 1.64 percent. The net import is 0.08 percent. In this case the balance of payments deficit. Similarly, GDP declined by 1.49 percent. Where GDP is a combination of total absorption and net export, this happens in a negative net export.

Price factors include factor price of labor (wage labor) and factor price of capital (interest rates). Changes in interest rates can be approximated by changes in the price of capital. The interest rate is closely related to the level of investment. If interest rates decline, the level of investment increases. The aggregate price (wage) labor and capital (interest rate) decreases. At one simulation, reduced productivity of poultry and eggs sector investments resulted in a decrease of 0.587 percent, although the price of labor and price of capital has decreased. Investment income decreased due to a decrease in households and companies, as well as government revenues. At the macro level can be seen GDP also fell, and then as a consequence is not an increase in investment, even investment declined. While the rate of inflation which can be seen from the changes in the CPI (Consumers Price Index) on a single simulation (reduced productivity of poultry and eggs) has no impact on the Consumer Price Index, this means no changes in the rate of inflation. Inflation has not changed since the Consumer Price Index used as *numeraire*numbers, where the number of *numeraire*= 1, which is a benchmark of prices in the model, so that the consumer price index or inflation in the simulation does not change.

6. CHAPTER VI

6.1. Conclusion

Decreased production of poultry meat sector (traditional and medium - large) and egg sectors impact on micro and macro- economic aspects. Micro level production decline and increase in the price of poultry meat sector, eggs, other livestock, restaurant and hospitality. While in the overseas market as well as a decline in export import.A decline in consumption by the entire group of households due to a decline acceptance by all groups of households and firms. Government revenue also decreased due to a decrease in taxes from households and firms. So it can be said to be a decline in household income and government groups. At the macro level, a decline in GDP, the decline in investment, falls prices of capital and labor. Likewise, interest rates decline, but the rate of inflation has not changed.

6.2. Recommendation

1. Decreasing production of poultry meat and eggs sector appears to have broad relevance to the economic foundations. This seems related sectors is changing. To prevent a sharper decline in the future need structural arrangement of the poultry sector and related sectors. One of them is to make revolution livestock industry. Then the livestock sector policies need to be strengthened by involving all relevant livestock industry synergistically.

2. It will be good if this research not only in one region, but also in other areas are also prone area or have been considering the case of bird flu has spread to 32 provinces. However this will be take high cost. If the researcher has the time and cost of continued relatively enough then it would be interesting if done.

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