The price effect of fertilizer and pesticide imports from China under the ACFTA tariff liberalization: Measuring the impact on labour market and household welfare

RESEARCH PROPOSAL
Presented to
Partnership for Economic Policy (PEP)

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Before you begin
Please consult the following webpages/documents regarding PEP’s expectations in terms of:

- Specific policy issues to be addressed by projects supported under the PAGE programme
- Scientific content of eligible research project proposals
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SECTION A – For all projects

1. Abstract (100 to 250 words)

   The abstract should state the main research question, the context and its relevance in terms of policy issues/needs in relation to PAGE thematic foci, complete with a brief description of the data that will be used.

   Since 2004, China’s fertilizers and pesticides have been rapidly penetrating Vietnam’s domestic markets, and in 2013, fertilizer and pesticide imports from China were accounted for 49 and 50 per cent of total import demand of these products of Vietnam, respectively. ASEAN-China Free Trade Area (ACFTA) tariff liberalization has been applied for the period of 2012-2014, of which fertilizer and pesticide import tax from China is set to zero.

   This proposed study analyses the effects of growth and nature of fertilizer and pesticide imports from China under the ACFTA tariff liberalization on local labour market as well as household welfare in Vietnam. The study begin by estimating what would be the possible effect of fertilizer and pesticide imports from China on prices of other goods, allowing for imperfect domestic price transmission and cost-push effects.

   As labour supply and demand can be affected by the price changes, the study explores three channels through which labour market would be affected: (i) changes in sectoral wage premiums; (ii) reallocation of workers from in agriculture, forestry and aquaculture into manufacturing; and (iii) enterprise job growth.

   Finally, the study examines how these changes in prices and wages would affect household welfare, taking into account the ripple effect a change in the domestic price of fertilizers and pesticides would have on other prices in the economy, and hence on household consumption, production and wage income.

2. Main research questions and contributions

   Explain the focus (or key questions) of your research and its policy relevance.

   2.1. Explain why you think this is an interesting research question and what the potential value added of your work might be (knowledge gaps). You might want to explain whether or not this question has been addressed before in this context (including key references), and if so, what do you wish to achieve (in addition) by examining the question again?
*Doi Moi*, a Vietnamese term meaning “renovation”, marked the beginning of a transition of the Vietnamese economy from a centrally planned to a more market-driven one. After the agricultural reforms in 1988, agricultural outputs rose tremendously and, in the following years, Vietnam became one of the biggest world’s exporters of rice, coffee and cashew nut. Being identified as a large agricultural economy, Vietnam has strong domestic demands of fertilizers and pesticides.

Since 2003, China’s fertilizers and pesticides have been rapidly penetrating Vietnam’s domestic markets. The value of Vietnam’s fertilizer and pesticide imports from China (mostly through border trade) soared particularly since 2007 and from then, its shares in total imports have always been greater than 40 percent (see figure 1). In 2013, fertilizer and pesticide imports from China accounted for 49 and 50 percent of total import demands of Vietnam for these products respectively (MARD, 2013).¹

**Figure 1 Fertilizer and Pesticide Imports from China**

![Graph showing fertilizer and pesticide imports from China](image)

Source: General Statistic Office of Vietnam.
Note: Import values are in current prices.

¹ According to General Statistic Office of Vietnam (2013), fertilizer imports from China consist of five different varieties, namely Urea, DAP, SA, Kali and NPK. Among them, Urea, DAP and SA imports are the majority (which account for 43.3, 43.2 and 13.1 percent of total fertilizer imports from China respectively). With regard to the share in total imports, imports from China are account for 76 percent of total Urea imports, 87 percent of total DAP import and 51 percent of total SA import.
ASEAN-China Free Trade Area (ACFTA) tariff liberalization has been applied for the period of 2012-2014, of which fertilizer import taxes from China has totally removed since 1\textsuperscript{st} January 2012 and pesticides import taxes from China has totally removed since 1\textsuperscript{st} January 2013 (Ministry of Finance’s Circular No. 162/2011/TT-BTC). At the same time, Chinese government reduced their fertilizer export tax. These trade policies would likely foster border imports of fertilizers and pesticides from China and then affect domestic prices of fertilizers, pesticides and other goods. These price changes would affect labour market, and hence household welfare.

The importance of fertilizers and pesticides in total production cost of agricultural sectors in Vietnam is increasing. Table 1 shows that costs of seeds, fertilizers and pesticides account for more than 42.4 per cent of the total costs related to rice cultivation in 2010. Dao et al. (2013) is the most updated rice value chain study in Vietnam. They find that costs of fertilizers and pesticides accounts for more than 50 per cent of total production cost of paddy cultivation in all two main annual crops, namely winter-spring crop 2011-2012 and spring-autumn crop in 2012.

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Seed, fertilizers, pesticides</td>
<td>42.4</td>
</tr>
<tr>
<td>2 Labour (self-employed)</td>
<td>9.6</td>
</tr>
<tr>
<td>3 Labour (hired)</td>
<td>20.6</td>
</tr>
<tr>
<td>4 Capital stock (incl. depreciation)</td>
<td>2.8</td>
</tr>
<tr>
<td>5 Irrigation fee</td>
<td>2.5</td>
</tr>
<tr>
<td>6 Interest (loan of inputs)</td>
<td>2.8</td>
</tr>
<tr>
<td>7 Interest (bank loan)</td>
<td>14.4</td>
</tr>
<tr>
<td>8 Transportation</td>
<td>1.6</td>
</tr>
<tr>
<td>9 Other (commission for collectors)</td>
<td>3.3</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Vo and Nguyen (2011).

It has long been agreed in literature that, trade policies affect the prices of goods and labour market. Brambilla, Porto and Tarozzi (2010) examine the response of catfish producers in Mekong Delta to the antidumping tariff imposed by U.S. government. Along with the slowing in income growth among catfish farmers, they also find that household did not adjust labour supply because of off-farm employment limitation. McCraig (2011) shows that the cuts in U.S. tariffs under U.S.-Vietnam Bilateral Trade Agreement could resulted in (i) increase in wage premium among rural workers and workers in agriculture, forestry, and fishing and (ii) faster allocation of workers from agriculture, forestry, and fishing into manufacturing.
Trade policy literature has also for many years emphasised that that trade liberalization would facilitate growth and that higher growth would in turn lead to welfare gain. Chi-Chung et al. (2002) investigate the behaviour of main rice exporters (Vietnam, Thailand and the United States) and rice importers (Japan, the Philippines, Europe, Brazil, and the former USSR) and find that there are welfare gains of 1,492 USD million when all trading countries comply with the free trade agreement (implies all countries are price-taker and act as perfect competitors). However, empirical evidence shows that distributional effect of trade liberalization is unlikely positive for all households. Nicita (2009) find that tariff liberalization in Mexico affect differently across income level and across geographic region. Coxhead et al. (2012), find a negative effect of increase in export price of rice on household welfare in Vietnam, especially among the poor.

This proposed study adds to the literature by providing an analysis of the effects of growth and nature of fertilizer and pesticide imports from China under the ACFTA tariff liberalization on local labour market as well as household welfare in Vietnam allowing for imperfect domestic price transmission and cost-push effects.

The study begins by estimating what would be the possible effect of fertilizer and pesticide imports from China on prices of goods and the response of the local labour market. So, the first research question would be “What would be the possible effects on prices of goods and labour market”?

As labour market can be affected by the price changes. The study explores three channels through which labour market would be affected: (i) changes in sectoral wage premiums particularly among rural workers and workers in agriculture, forestry and aquaculture; (ii) reallocation of worker from in agriculture, forestry and aquaculture into manufacturing; and (iii) enterprise job growth.

Finally, the study examines how the changes in prices and wages would affect household welfare, taking into account the ripple effect a change in the domestic price of fertilizers and pesticides would have on other prices in the economy, and hence on household consumption, production and wage income. So, the second research question would be: “What would be the distribution of gains or losses both across income levels and across geographical region?”

There would be two main interesting reasons for this proposed study. First, in the last two decade, Vietnam has rapidly opened its economy for border trade with China. This resulted to the radically growth of fertilizer and pesticide imports from China through Lao Cai Province – the main port of entry of Vietnam fertilizer and pesticide imports (see Appendix Table 3). Second, Vietnam domestic markets are poorly interconnected and heterogeneous, the effects would expected to be different across geographic area.

2.2. Describe the specific policy issues/needs that your research aims to address; how your potential outcomes/findings may be used in policy making?

- Justify timing of your research in terms of policy and socioeconomic needs/context – e.g. reference to existing/planned/potential policies at the national level.
- Evidence of previous consultation with potential users (e.g. policymakers and key stakeholders) to help define your research question is strongly encouraged. Include a list of names, institutions and email addresses when possible.
There are two main policy issues addressed by this proposed study:

1. ACFTA tariff liberalization has become one of major trade policies in Vietnam trade performance. Though its main aim is to promote bilateral trade performance between Vietnam and China, the question that “how could Vietnam effectively implements ACFTA tariff liberalization?” still be opened.

As ACFTA agreement directly affects the prices of fertilizers and pesticides imported from China by imposing a “zero tax rate” at the border, price of these products imported from China are much lower than those domestically produced in Vietnam. According to Government of Vietnam, domestically produced fertilizers and pesticides could not be able to compete with imported ones from China in terms of prices (VGPNEWS, 2013). In order to protect domestic production of fertilizers and pesticides, Government of Vietnam decides to impose a 3 percent tax rate levy on imported fertilizers and pesticides as of 1st January 2014 (Ministry of Finance’s Circular No. 164/2013/TT-BTC issued on 15/11/2013). Two policy questions could be raised from this context: What would be the effects of this new trade policy on labour markets? Would rural households, which mostly are rice producers, benefit from this policy?

This study has so far received a great interest of Institute of Policy and Strategy for Agriculture and Rural Development and National Assembly’s Economic Board. The results could be served as inputs for trade policy makers in Vietnam.

2. In Vietnam, the rural workers are pervasive. Having no social security, poor and very low education levels, amongst the lowest quintile in terms of income, also means that rural workers’ vulnerability to various shocks is very high. Though Vietnam continues to be identified as agricultural economy, the proportion of workforce in agriculture has decreased by 13% between the last decade – an out migration of around 6.1 million workers (M4P, 2012). Much of this agricultural out-migration has been driven through increased agricultural productivity (increased productivity allows the agricultural sector to shed labour, leading to labour surplus in rural areas) with labour funneled to more productive and better paying work in the manufacturing and services sectors. However, rural out-migrants face constraints of un-skills working in manufacturing and service sectors.

The Government’s decision 1956 dated 27/11/2009 on “supporting vocational training for rural labourers until 2020” is one of the most significant policy responses in this respect. However, the most challenging task of implementing the Decision 1956 has been the lack of scientific evidence on labour demands in specific economic activities. Consequently, training programs designed in the Decision 1956 mismatched the de-facto need of the labour market, wasting the government budget. Therefore, our study which provides the allocation of labourers in each sector is helpful to the Decision 1956 in designing the right skills for training programs.

The study explores three channels through which labour market would be affected: (i) changes in sectoral wage premiums (ii) reallocation of workers from in agriculture, forestry and aquaculture into manufacturing; and (iii) enterprise job growth. The results from this study could be served as inputs for effective implementation of decision 1956 in Vietnam.
3. Methodology

Presentation of the specific techniques that will be used to answer the research questions and how exactly they will be used to do so. Explain whether you will use a particular technique normally used in other contexts or whether you intend to extend a particular method and how you will do so. Explain if these methods have already been used in the context you are interested in (including key references).

As discussed in the previous section, the ACFTA tariff liberalization would likely foster fertilizer and pesticide border imports from China and then affects domestic prices of fertilizers, pesticides and of other goods. These price changes would affects labour market, and hence household welfare.

This section first shows how to estimate imperfect fertilizer and pesticide price transmission, and cost-push effects a change in the fertilizer and pesticide prices would have on other prices in the economy. Second, the response of the labour market to changes in goods’ prices would be measured. Finally, we model how these changes would affect household welfare, taking into account the ripple effects a change in the fertilizer and pesticide prices would have on other prices in the economy, and hence on household consumption, production and wage income.

3.1 Modelling the price changes – a micro-macro model

a. Estimation of pass-through effect – a micro econometric model

Following Nicita (2009), there are two channels through which trade policy affects domestic price of fertilizers/pesticides: (i) by imposing a tax at the border, trade policy directly affects the price of imported fertilizers and pesticides; (ii) then, domestic producers compete with these imported goods, trade policy indirectly affects the price of local fertilizers and pesticides through changes in local producers’ markup. The market price of good \( g \) (which are namely fertilizers and pesticides) faced by households in time \( t \) in region \( r \) (\( P_{gtr} \)) is a function of domestic producer price (\( P_{P_{gtr}} \)) and the imported price from China in local currency (\( P_{X_{gt}} \)), the tariff (\( \tau_{gt} \)) and the trade costs (\( TC_{gr} \)).

\[
P_{gtr} = P^a_{gtr}(P_{X_{gt}}(1 + \tau_{gt})TC_{gr})^{1-\alpha}
\]  

(1)

Based on the standard pass-through literature (Goldberg and Knetter, 1997; Campa and Goldberg, 2002; Nicita 2009), unrestricted form of the log-linearized version of equation (1) can be derived as follows:

\[
lnP_{gtr} = \beta_0 + \beta_1lnP_{gtr} + \beta_2lnP_{X_{gt}} + \beta_3lnTC_{gr} + \gamma ln(1 + \tau_{gt}) + \varepsilon_{gtr}
\]  

(2)

Remarks:

a. Imported prices of fertilizers and pesticides are the average prices, which is computed as the weighted average that takes into account differences in imported values of varieties of these products. Domestic producer prices of fertilizers and pesticides are the simple average prices across varieties of these products and are provincial specific.

b. In Vietnam, there are more than 50 fertilizer manufacturers (Fertilizer Association of Vietnam, 2014) and 300 pesticide manufacturers (Vietnam Pesticide Association, 2014), which locate all over the nation from the north region to the south region (see Appendix Table 2 for regional
map of Vietnam). Therefore, it is very difficult to track back trade cost associated with domestic produced fertilizers and pesticides. Trade costs are assumed to affect only imported fertilizers and pesticides.

c. The parameter $\alpha$ is a measure of the extent to which domestic produced fertilizers and/or pesticides dominate over the imported ones. At one extreme, if domestic produced fertilizers (or pesticides) dominate the local markets, $\alpha = 1$, and the pass-through is zero. One the other extreme, imported fertilizers (or pesticides) from China fully determine the local price, $\alpha = 0$, and the pass-through is complete.

d. Since all fertilizers and pesticides imported from China via main port of entry at Lao Cai province, we use the distances to this main port of entry as proxy for trade costs. That is to say the trade costs, $TC_{gr}$, are the shortest driving distances from each of regions’ capitals to Lao Cai province.

e. In equation (2), $PP_{gr}$ could be endogenous. Following Nicita (2009) we can use two-month lagged values as instruments.

f. Following Nicita (2009), we can use fixed effects by geography areas to control for unobserved characteristics of regions.

The fixed effect model will be used if statistical tests show that this is the correct specification for our data. In case of using the fixed effect model, the time-constant variable $TC$ is excluded and the interaction term between the distance and the tariff rate is added into the empirical specification as follows:

$$\ln P_{gtr} = \beta_0 + \beta_1 \ln PP_{gtr} + \beta_2 \ln PX_{gt} + \beta_3 TC_r + \gamma \ln (1 + \tau_{gt})$$
$$+ \gamma_1 \ln (1 + \tau_{gt}) TC_r + \gamma_2 (\ln (1 + \tau_{gt}) TC_r)^2 + \epsilon_{gtr}$$

(3)

g. Data are monthly imported and producer prices of fertilizers and pesticides from January 2008 to December 2013.

b. Estimation of price change of other good – a macro model

Equation (2) allows us to estimate the market price of fertilizers and pesticides faced by households (as a function of imported price and domestic produced price of fertilizers and pesticides). However, any change in prices of fertilizers/pesticides will result in changes in prices of other goods in the economy.

There are several ways of modelling the ripple effect a change in the market price of fertilizers and pesticides would have on other prices in the economy. The econometric estimation model (Nicita et al., 2005; Balat et al., 2009) and the global simulation model (Francois and Hall, 2009) are useful for simulating effects of tariff reductions and global, regional or unilateral trade policy changes, but not useful for simulating the effects of price changes of some sectors’ products on the prices of other sectors’ products in an economy. Moreover, the data limitation with regard to key inputs (such as export supply elasticities, import demand elasticities) is a main constraint of these estimations, particularly in terms of making concordance of the trade data classification with the living survey classification.
In order to estimate the price changes that resulted from a change in tariff or prices of goods, one could use the Computable General Equilibrium (CGE) model (Chen and Ravallion, 2004). The advantage of using CGE model is its flexibility in the sense that different assumptions with regard to the functioning of the economy can be imposed. However, for Vietnamese economy, a major weakness of applying CGE model is the limitation of time series data required to estimate the elasticities and/or data required to calibrate the parameters of the model to have an accurate representation of the economy. Table 2 shows the history of SNA-based input-output table compilation in Vietnam. Until now, General Statistic Office of Vietnam has compiled five national input-output tables but not social accounting matrices (SAMs). There are some SAMs, which were compiled for Vietnam based on national IO tables (Tarp et al., 2001; Tarp et al., 2003; Tarp and Jensen, 2006). However, these data are unofficial, for particular studies and only available upon requested. Therefore, there were few studies using their own estimations of elasticities/parameters for Vietnamese economy. The most recent study studies using CGE models for Vietnamese economy have so far based on parameters from other ‘similar’ economies (Coxhead et al., 2012).

Table 2: SNA-Based IO Compilation in Vietnam

<table>
<thead>
<tr>
<th>Reference Year</th>
<th>Size</th>
<th>Type</th>
<th>Methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 1989</td>
<td>54x54</td>
<td>Competitive/Current price</td>
<td>Direct Full Survey</td>
</tr>
<tr>
<td>2) 1996</td>
<td>97x97</td>
<td>Competitive/Current price</td>
<td>Direct Full Survey</td>
</tr>
<tr>
<td>3) 2000</td>
<td>112x112</td>
<td>Competitive/Current price</td>
<td>Direct Full Survey</td>
</tr>
<tr>
<td>4) 2007</td>
<td>138x138</td>
<td>Competitive/Current price</td>
<td>Direct Full Survey</td>
</tr>
<tr>
<td>5) 2011</td>
<td>Not yet available</td>
<td>Competitive/Current price</td>
<td>Direct Full Survey</td>
</tr>
</tbody>
</table>

Source: Ngoc et al. (2006)

Taking into account the methods and data availability, in order to estimate the price changes, we would prefer to use the cost-push Leontief price model (Miyazawa, 1976; Oosterhoven, 1996; Dietzenbacher, 1997; ten Raa, 2005; and Miller and Blair, 2009). In a cost-push Leontief price model, the value added coefficient is the difference between the revenues per unit of output (the price of commodity) and the material costs per unit of output. Hence, the cost-push Leontief price model has the following equation:

\[ p = A'p + v \]  

(4)

where:

- \( p \) is the column vector of index prices [# of sectors (n)];
- \( v \) is the column vector of value added coefficient (value added per unit of output) [# of sector (n)]; and

\[ A \] is a transpose of the input coefficient matrix [# of sector (n) by # of sector (n)].

If the farm gate price of paddy increases, which is considered a price shock, we could estimate the changes in price of other goods using equation (1). Following Miyazawa (1976), we split the set of \( n \) sectors of the input-output (I-O) table into two subgroups, namely: the \( P \) sector, which consists of the
paddy sector and the $S$ sector, which consists of the rest $n - 1$ sectors of the economy. The $n \times n$ input coefficient matrix $A$ is:

$$A = \begin{bmatrix} P & P_1 \\ S_1 & S \end{bmatrix}$$

where:

$P(1 \times 1)$ and $S_1(n - 1 \times 1)$ are the sub-matrices of input coefficients of the paddy sector; and

$P_1(1 \times n - 1)$ and $S(n - 1 \times n - 1)$ are the submatrices of input coefficients of the rest $n - 1$ sectors.

Equation (4) could be re-written for the two subgroups as follows:

$$\begin{align*}
    & p_p = P'p_p + S_1'p_s + v_p \\
    & p_s = P_1'p_p + S'p_s + v_s
\end{align*}$$

(5)

where:

$p_p$ and $p_s$ are column vectors of index prices of $P$ sector’s product (which is paddy) and $S$ sector’s products (which are the rest $n - 1$ products in the economy), respectively;

$v_p$ and $v_s$ are $P$ sector and $S$ sector’s column vectors of value added coefficients, respectively; and

$P'$, $S_1'$, $P_1'$ and $S'$ are transposes of the matrices $P$, $S_1$, $P_1$ and $S$, respectively.

As we want to estimate the effects of paddy price change on prices of other goods in the economy, in system (5), we take $p_p$ and $v_s$ as exogenous variables, whereas $p_s$ and $v_p$ are endogenous variables.

Under the cost-push effect, if the price of paddy rises from $p_p$ to $(p_p + \Delta p_p)$, we could determine the price increase in other $S$ sectors by solving the system as follows:

$$\Delta p_s = (I - S')^{-1}P_1'\Delta p_p = T'P_1'\Delta p_p = (P_1T)'\Delta p_p = T_1'\Delta p_p$$

(6)

Remark: The price increase in other S sectors estimated under equation (4) could be viewed as a results of (a) direct effects of change in the price of paddy, (b) second-order or indirect effects and (c) paddy input in $S$ sectors induced by internal propagation in $S$ sector industries: $T_1 = P_1T = P_1(I - S)^{-1}$ (Miyazawa, 1976).

3.2 Estimation of labour market responses

It has long been agreed in literature that, much of this agricultural out-migration has been driven through increased agricultural productivity (increased productivity allows the agricultural sector to shed labour). Given the unchanged level of demand on grains, when agriculture productivity increases,
labour demand in agriculture decreases, resulting in rural out-migration with labour funneled to more productive and better paying work in the manufacturing and services sectors. This argument is well supported by the case of China (Perkins, 1969; Chan, 1994; Song and Sheng, 2008).

Hence, in Vietnam, assuming the decrease in price of fertilizers and pesticides, agricultural productivity will certainly improved (as fertilizers and pesticides account for 50 percent of total production cost of growing paddy – see section 2.1) the labour demand in agriculture will responses to this change, then shifting the demand curves. Consequently, there will be reduction in agricultural employment. This paper will model how these responses of the labour market could be captured.

a. Changes in sectoral wage premiums

In order to estimate the elasticity of wages with respect to changes in prices, we can modify the system in equation (5) by splitting the value-added component of each sector into a wage component \( w \) (compensation of employees per unit of output) and a capital stock component \( r \) (rent paid to capital stock per unit of output):

\[
\begin{align*}
\{ p_p &= P' p_p + S'_1 p_s + w_p + r_p \\
        p_s &= P'_1 p_p + S' p_s + w_s + r_s \\
\}
\tag{7}
\end{align*}
\]

with:

\[
\begin{align*}
\{ v_p &= w_p + r_p \\
        v_s &= w_s + r_s \\
\}
\end{align*}
\]

As we take \( p_p \) and \( v_s \) as exogenous variables, whereas \( p_s \) and \( v_p \) are endogenous variables, from system (7), the variation of \( v_p \) could be seen as the change in wage in the \( P \) sector owing to the change in price of \( P \) sector’s product (Miyazawa, 1976). Under the cost-push effect, if the price of \( P \) sector’s product increases from \( p_p \) to \( (p_p + \Delta p_p) \), under the assumption that capital stock coefficients \( r_p \) and \( r_s \) are constant in the short term and thus have not been affected by price changes, we obtain:

\[
\Delta w_p = \{(I - P') - S'_1T'P'_1\} \Delta p_p 
\tag{8}
\]

The term \( \Delta w_p \) is the response of equilibrium wages in \( P \) sector to the change in prices of \( P \) sector’s product.

The responses of the equilibrium wages to prices under equation (8) will differ across sectors (industry premia) and across geographical region (due to the pass-through effect).

b. Reallocation of workers from in agriculture, forestry and aquaculture into manufacturing

As mentioned above, agricultural (and forestry and aquacultural) out-migration is one of the three channels through which price changes affect labour market. To examine this channel, for each economic group \( S \) sector (namely agriculture, forestry and aquaculture; manufacturing sectors; and services), following McCaig (2011), we use the following regression equation:

\[
\ln(L_{S,r,t_2}) - \ln(L_{S,r,t_1}) = \alpha_1 + \alpha_2 P_{S,r} + \alpha_3 X_r + \varepsilon_r 
\tag{9}
\]
where:

\[ L_{s,r,t} \] is the share of workers employed in group S sector, in region r at time t;

\[ P_{s,r} \] is vector contains the changes in prices of goods of group S sector during the period of study (from \( t_1 \) to \( t_2 \)); and

\[ X_r \] is the vector contains the initial share of employment in each major industry of group S sector.

c. Job creation

Vietnam has a thriving informal economy where the jobless can take refuge, most new entrants within the labor market that are unable to find jobs in the formal sectors or laid-off workers will not become unemployed, but rather they will end up working in the informal sector (Cling et al., 2010). To examine these channels of labour market impacts, we use the our variant of McCaig’s model (2011) for formal and informal sectors separately, which are as follows:

\[
\ln(\text{formal jobs}_{s,r}^{t_2}) - \ln(\text{formal jobs}_{s,r}^{t_1}) = \beta_1 + \beta_2 P_{s,r} + \beta_3 X_r + \epsilon_r
\]

(10)

\[
\ln(\text{informal jobs}_{s,r}^{t_2}) - \ln(\text{informal jobs}_{s,r}^{t_1}) = \beta_1 + \beta_2 P_{s,r} + \beta_3 X_r + \epsilon_r
\]

(11)

where:

\( \text{formal jobs}_{s,r}^{t_2} \) is the number of formal employees in group S sector, in region r at time t;

\( \text{informal jobs}_{s,r}^{t_2} \) is the number of informal employees in group S sector, in region r at time t;

\( P_{s,r} \) is vector contains the changes in prices of goods of group S sector during the period of study (from \( t_1 \) to \( t_2 \)); and

\( X_r \) is a vector of the regional dummies.

Remark: Achieving agricultural out-migration would need to be accompanied by very rapid increases in industrial jobs. This estimation of enterprise job creation would show absorbance of formal labour market to out-migration from agricultural sectors estimated by equation (10) and (11).

4.3 Modeling the welfare effects

We use non-parametric density estimations and regressions to study the distributional effects of rice price changes in relation to household characteristics, particularly living standards and geographical locations. The idea of non-parametric analysis was first introduced by Deaton (1989a) and then extensively used in various studies on welfare analysis (Deaton, 1989b; Budd, 1993; Benjamin and Deaton, 1993; Barrett and Dorosh, 1996; Sahn and Sarris, 1991). An extension of Deaton (1989a) considers the responses of the labour market because a change in the price of a good will affect the labour demand and then the wage in production sector of this good.
For each household, the welfare impact could then be calculated as follows:

$$d u^h = \sum_p (\phi^h_p - c^h_p) d p_p + \sum_{p,j} \theta^h_j \varepsilon \omega_p d p_p$$  \hspace{1cm} (12)$$

where:

- $\phi^h_p$ is the share of household income from production of good $p$;
- $c^h_p$ is the income share of household consumption (spent) on good $p$;
- $\theta^h_j$ is the share of wage income in total household income for member $j$; and
- $\varepsilon \omega_p$ is the elasticity of wages earned with respect to price of good $p$ (estimated in equation (8)).

**Remarks:** The change in the prices of fertilizers and pesticides and the changes in the prices of other goods (first step) affect both household incomes from production of and consumption spent on these goods. Changes in wages (second step) affects wage income of household members. Households’ exposure to price and wage changes depends on the structure of their income and the allocation of their expenditures.

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4. **Data requirements and sources**

This is a critical part of the proposal. The key issue is to explain the reason for the use of the particular data. You must establish that they are ideal for the question you wish to address. Please consult the “Guide for designing a research project proposals” for more detail.

Data on monthly import prices and domestic produced prices of fertilizers and pesticides are available from the Information Center for Agriculture and Rural Development (AgroInfor) for the period of January 2008 to December 2013.

For the estimation of the price changes, we use the national input-output tables of 2007 published by the General Statistics Office (GSO) of Vietnam, which is the latest national benchmark input-output table based on a direct full survey and released in the year 2010. The Vietnam input-output table of 2007 classifies commodities and industries into 138 three-digit level commodities/industries.

For the estimation of reallocation of workers from in agriculture, forestry and aquaculture into manufacturing and level of job creation we use the Annual Labour Force Surveys published by the Ministry of Labour Invalids and Socio Affairs (MOLISA) of Vietnam.

This paper uses the data available from the Vietnam Household Living Standards Survey in 2010 (VHLSS-2010) to estimate household welfare effects. VHLSS-2010 has been conducted by the GSO with technical assistance from the UN Statistics Division, the World Bank, and Statistics Sweden. The surveys are representative at the national level.
In terms of sample design, the VHLSS-2010 is a classical three-stage stratified random survey, covering the ordinary households at the national level. The sample size is quite large, with 45,000 households surveyed in the full sample each year. However, since a detailed questionnaire (including expenditures and other subject-specific modules) has been applied to a random subsample of around 9,000 households, our policy simulations were based on the 9,000 households in the VHLSS who were selected for the full questionnaire out of the 45,000 total households surveyed.

The VHLSS-2010 includes a number of modules providing information on demographics, education, employment, health, income and labour supply. There is an expenditure module and extensive modules with information about farm activities related to agriculture, livestock and aquaculture (including production, sale, inputs, and investment).

In order to make a concordance of the input-output table classification with the VHLSS classification, we aggregate the input-output table into 135 sectors and 81 sectors for estimations of household consumption/income effects and labour income effects, respectively.

*Note: GSO of Vietnam has done the compilation work for input-output tables of 2011 and VHLSS 2012, but these data is still not available. We do hope to get access to these updated input-output table and VHLSS database during the beginning of project course.*

5. **Policy influence plan (or research communication strategy)**

- Identify potential users of your research findings, including policymakers and other key stakeholders. Provide a list of institutions and, whenever possible, specific individuals to be targeted for effective policy influence. Please also indicate whether you have already made contacts within the institution.

- How, in the elaboration and execution of your project (from design to dissemination), will you consult/communicate with these users to both gather their inputs and keep them informed of your project (expected contributions and uses), in order to increase chances of your findings to be taken-up into policymaking?

You can refer to **PEP’s research communications strategy and guidance** to have a better idea of what is expected in terms of activities for policy outreach and dissemination.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Contact</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vietnam Academy of Social Sciences (VASS), Centre for Analysis and Forecasting (CAP) (already made contacts within the institution)</td>
<td>Hai Anh, LA (Team member)</td>
<td>ACFTA tariff liberalization</td>
</tr>
<tr>
<td></td>
<td>Dr. Nguyen Thang, Director of CAP</td>
<td>Advocacy at National Assembly’s Economic Board</td>
</tr>
<tr>
<td>Institute of Policy and Strategy for Agriculture and Rural Development, Strategy and Policy Research Division</td>
<td>Thang Cong, TRAN (team member) Director of SPRD</td>
<td>New Rural Programme, which involve rural households</td>
</tr>
</tbody>
</table>
5.1 Use of research findings in policymaking

This study outcome could also be served as an input for (i) ACFTA tariff liberalization, (ii) New Rural Programme and (iii) 1956 programme on vocational training for rural labourers till 2020.

The following institutions will use the outcome of own research:

- Vietnam Academy of Social Sciences (VASS), Centre for Analysis and Forecasting.
- Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD), Strategy and Policy Research Division
- National Institute for Vocational Training (NIVT)

5.2 Dissemination/outreach

a. Seminars/National policy conference

At least two seminars will be conducted. The scientific seminar could be organized in VASS and the national policy conference will be held in IPSARD.

b. Policy advocacy

Direct channel 1: IPSARD is in charge of agricultural policy formulation and advocacy, this study outcome could be efficiently served as an important input for providing changes of New Rural Programme in subsequent years. Mr. Thang Tran Cong, Director of Strategy and Policy Research Division, is in charge to for this task.

Direct channel 2: VASS, has regularly conduct research projects in order to used as input materials for Advocacy at National Assembly. Hence, through VASS, our research outcome could be presented at regular meeting of National Assembly. Dr. Nguyen Thang, Director of CAP and Ms. Hai Anh La, researcher at VASS and Associate Member of National Assembly’s Economic Board, is in charge to for this task.

Direct channel 3: NIVT is in charge of the coordination and implementation (at centre level) of the 1956 programme. Dr. Mac Van Tien, director of NIVT. Through NIVT and particularly under cooperation with Dr. Mac Van Tien, this study outcome could be efficiently served as an important input for providing changes to the approach of the 1956 program in subsequent years.
c. Working papers

The findings of the study will be also posted in international website of PEP. The team will make efforts to present the study in a format of PEP working paper.

d. Publication

The working paper then will be submitted to be published at least one international economic journal and two or three of the domestic journals. The international economic journals where this research could be submitted are: The Economic Journal or Journal of Development Economics.

The detailed methodology and findings could be published in one of the domestic economic journals, namely Vietnam’s Socio-Economic Development, which is published quarterly by the Vietnam Institute of Economics; The Economic Studies, which is published monthly by the Vietnam Institute of Economics; and Journal of Development Economics, the National Economic University (NEU), Hanoi.

The Policy Brief could be published in Economy and Forecast Review, published monthly by Ministry of Planning and Investment (MPI).

6. List of team members

Indicating their age (or whether they are under 30), sex, as well as relevant/prior training and experience in the issues and research techniques involved (start with lead researcher).

Note that PEP favors gender-balanced teams, composed of one senior (or experienced) researcher supervising a group of junior researchers, including at least 50% female researchers contributing substantively to the research project. PEP also seeks gender balance in team leaders and thus positively encourages female-led research teams. (Each listed member must post an up-to-date CV in their profile on the PEP website – refer to “How to submit a proposal”)

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Sex (M,F)</th>
<th>Training and experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ngoc Q. PHAM</td>
<td>39</td>
<td>M</td>
<td>Ngoc gained MBA in Economics Policy and Corporate Strategy in Maastricht School of Management, the Netherlands and studied PhD in Economics and Policy Studies of Technical Change in University of Maastricht of the Netherlands. Ngoc was labour market expert of Policy Action Research Unit, DFID-ADB funded project Making Market Work Better for the Poor II (M4P2) (2009-2012). Currently, he is a macro economist and a labour market expert.</td>
</tr>
</tbody>
</table>

He has done many researches on poverty, labour market and trade. He has also gained considerable experience in policy action research and policy advocacy.

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Gender</th>
<th>Details</th>
</tr>
</thead>
</table>
| Ha Anh, LA        | 35  | F      | Hai Anh is Research Fellow at Centre for Analysis and Forecasting (CAF), Vietnam Academy of Social Sciences (VASS). She has successfully completed PhD in Economics (The Australian National University, Canberra, Australia, 2011), MA in Economics at Vietnam-Netherlands Master Programme (National Economic University, Hanoi, 2002).

Hai Anh has gained considerable experience in modeling, the design, management and evaluation of data surveys in Viet Nam. Hai Anh can in charge to coordinate with CAF for our dissemination strategy to contribute on policy formulation. |
| Bich Thi, TRAN    | 41  | F      | Bich is Deputy chief of Socio-Economic Statistics Branch, Department of Statistics, at The National Economics University, Hanoi. She gained PhD in Economics (The Australian National University, Canberra, Australia, 2008) and MBA at French-Vietnamese Management Centre (1996).

Bich has done many researches on migrant, labour market and informal sector. |
| Thang Cong, TRAN  | 38  | M      | Thang is a director of Strategy and Policy Research Division (SPRD), Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD). He got PhD in Agricultural Economics, The University of Western Australia (2010).

Thang has gained considerable experience in agricultural economics and development, particularly his position could be served as a policy advocacy and coordination for our dissemination strategy to contribute on policy formulation. |
| Huyen Thi, NGUYEN | 24  | F      | Huyen gained bachelor of Statistics, National Economic University in 2011. She is now a junior researcher at Development and Policies Research |
7. Expected capacity building

Description of the research capacities that team members (and potentially their affiliated institutions) are expected to build through their participation in this project.

This is an important aspect in the evaluation of proposals and should be presented in some detail. What techniques, literature, theories, tools, etc. will the team and their institutions learn (acquire in practice) or deepen their knowledge of? How will these skills help team members in their career development? Also indicate which specific tasks each team member would carry out in executing the project.

(1) Team leader: Ngoc Q. PHAM (Mr)

Expected capacity building:
- Deepen knowledge of labour market; poverty and microeconometrics.
- Improve relationship with other State organizations, and international agencies, and other research institutes during the research.
- Improve policy advocacy/intervention experience.

(2) Team member: Hai Anh, LA (Ms)

Expected capacity building:
- Deepen knowledge of ex-ante analysis of distribution effects on household welfare.
- Help others team members improve the research skills and knowledge of data and statistics.
- Improve policy advocacy/intervention experience.

(3) Team member: Bich Thi, TRAN (Ms)

Expected capacity building:
- Deepen knowledge of poverty, and labour market.
- Improve research skills particularly in macro modeling, writing.
- Help others team members improve the research skills and knowledge of microeconometrics and statistics.

(4) Team member: Thang Cong, TRAN (Mr)

Expected capacity building:
- Deepen knowledge of ex-ante analysis of distribution effects on household welfare.
- Improve policy advocacy/intervention experience.

(5) Team member: Huyen Thi, NGUYEN (Ms)

Expected capacity building:
- Gain data process skills
- Gain research skills particularly in ex-ante analysis of distribution effects on household welfare.
- Gain relationship with other State organizations, and international agencies, and other research institutes during the research.

(6) Team member: Khoa Dang, NGUYEN (Mr)

Expected capacity building:
- Gain data process skills
- Gain research skills particularly in microeconometrics and statistics.
- Gain relationship with other State organizations, and international agencies, and other research institutes during the research.

<table>
<thead>
<tr>
<th>Name</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ngoc Q. PHAM</td>
<td>Introduction and Literature review (main responsibility); Modelling (main responsibility); Robustness and Sensitivity analysis; Report writing (including response to comment and revising report) (main responsibility); Working Paper writing and Technical Report preparation (main responsibility).</td>
</tr>
<tr>
<td>Ha Anh, LA</td>
<td>Modelling; Data works (main responsibility); Policy influence plan (main responsibility).</td>
</tr>
<tr>
<td>Bich Thi, TRAN</td>
<td>Introduction and Literature review (main responsibility); Robustness and Sensitivity analysis (main responsibility); Report writing (main responsibility); Working Paper writing.</td>
</tr>
<tr>
<td>Thang Cong, TRAN</td>
<td>Report writing (Policy recommendation) (main responsibility); Policy Brief writing (main responsibility); Policy influence plan;</td>
</tr>
<tr>
<td>Huyen Thi, NGUYEN</td>
<td>Data works; Involve in Report Writing (interpretation of results), Policy Brief writing.</td>
</tr>
<tr>
<td>Khoa Dang, NGUYEN</td>
<td>Data works; Involve in Modelling (partial equilibrium) and Involve in Report Writing (interpretation of results).</td>
</tr>
</tbody>
</table>
### 8. List of past, current or pending projects in related areas involving team members

Name of funding institution, title of project, list of team members involved

<table>
<thead>
<tr>
<th>Name of funding institution</th>
<th>Title of project</th>
<th>Team members involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFID-ADB funded project Making Market Work Better for the Poor II (M4P2)</td>
<td>Improve the relevance of the TVET system to the need of private sector in order to enhance skill development and contribute to poverty reduction in local area</td>
<td>Ngoc Q., PHAM</td>
</tr>
<tr>
<td>DFID-ADB funded project Making Market Work Better for the Poor II (M4P2)</td>
<td>Improving informal sector training apprenticeship system</td>
<td>Ngoc Q., PHAM; Bich Thi, TRAN</td>
</tr>
<tr>
<td>Action-Aid International Vietnam</td>
<td>Impact of Public Investment on Poor People in Agricultural Sector During 2000-2008</td>
<td>Bich Thi, TRAN</td>
</tr>
<tr>
<td>Working Paper</td>
<td>Remittances from Migrants - Experience from Vietnamese Households</td>
<td>Hai Anh, LA</td>
</tr>
<tr>
<td>ADB, funded by the People's Republic of China Regional Cooperation Poverty Reduction Fund</td>
<td>Trade Liberalization under ASEAN-China Free Trade Agreement and its possible impacts on Vietnamese industries</td>
<td>Hai Anh, LA</td>
</tr>
<tr>
<td>Embassy of Denmark and IFPRI</td>
<td>Policy Options for Using Livestock to Promote Rural Income Diversification and Growth in Vietnam</td>
<td>Thang Cong, TRAN</td>
</tr>
<tr>
<td>ADB</td>
<td>The participation of the poor in value added chain: The case of tea and cassava in Vietnam</td>
<td>Thang Cong, TRAN</td>
</tr>
</tbody>
</table>

### 9. Describe any ethical, social, gender or environmental issues or risks that should be noted in relation to your proposed research project.

No noteworthy risk
10. Reference


# 11. Appendix

Table 3: Imports of Fertilizer and Pesticide from China – 1996-2011

<table>
<thead>
<tr>
<th>Year</th>
<th>Fertilizers</th>
<th>Pesticides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Import value</td>
<td>Share in total imports</td>
</tr>
<tr>
<td>1996</td>
<td>1900</td>
<td>0.30%</td>
</tr>
<tr>
<td>1997</td>
<td>3400</td>
<td>0.77%</td>
</tr>
<tr>
<td>1998</td>
<td>15200</td>
<td>3.21%</td>
</tr>
<tr>
<td>1999</td>
<td>24000</td>
<td>5.24%</td>
</tr>
<tr>
<td>2000</td>
<td>106100</td>
<td>20.89%</td>
</tr>
<tr>
<td>2001</td>
<td>62600</td>
<td>14.97%</td>
</tr>
<tr>
<td>2002</td>
<td>58000</td>
<td>12.13%</td>
</tr>
<tr>
<td>2003</td>
<td>243200</td>
<td>38.53%</td>
</tr>
<tr>
<td>2004</td>
<td>392000</td>
<td>47.60%</td>
</tr>
<tr>
<td>2005</td>
<td>264300</td>
<td>41.25%</td>
</tr>
<tr>
<td>2006</td>
<td>306151</td>
<td>43.98%</td>
</tr>
<tr>
<td>2007</td>
<td>589184</td>
<td>58.82%</td>
</tr>
<tr>
<td>2008</td>
<td>720704</td>
<td>48.86%</td>
</tr>
<tr>
<td>2009</td>
<td>581649</td>
<td>41.05%</td>
</tr>
<tr>
<td>2010</td>
<td>603942</td>
<td>49.50%</td>
</tr>
<tr>
<td>2011</td>
<td>777919</td>
<td>43.72%</td>
</tr>
</tbody>
</table>

Source: General Statistic Office of Vietnam

Note: Import values are in thousand of USD (at current price).
Figure 2: Vietnam regional map

Source: GSO of Viet Nam.
Note: The eight socio-ecological zones recognized by the GSO of Viet Nam:
(1) Red River Delta; (5) South Central Coast;
(2) Northeast; (6) Central Highlands;
(3) Northwest; (7) Southeast;
(4) North Central Coast; (8) Mekong River Delta;