

MPIA Network Session Paper

**IMPACTS OF PUBLIC SPENDING ON
GROWTH AND POVERTY ALLEVIATION IN
VIETNAM: A DYNAMIC GENERAL
EQUILIBRIUM ANALYSIS**

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Revised proposal

IMPACTS OF PUBLIC SPENDING ON GROWTH AND POVERTY ALLEVIATION IN VIETNAM: A DYNAMIC GENERAL EQUILIBRIUM ANALYSIS

RESEARCH PROPOSAL

Presented to

PEP Network

By

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&

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COUNTRY: VIETNAM

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Abstract

Poverty reduction has been one of the most significant achievements of economic and social development in Vietnam since the 1990s. The poverty rate, measured by international standard has been reduced nearly by two third within 11 years from 58.1% in 1993 to 19.5% in 2004. This achievement puts Vietnam in line with few countries that have fulfilled their Millennium Development Goal on poverty reduction ahead of the schedule. Other social dimensions of poverty such as education, health care, gender equality have also been improved remarkably. The success has been attributable to a wide range of policy measures including comprehensive economic reforms, trade liberalisation, private sector development, and public spending.

The proposed study attempts to measure the impact of most important government spending (on agricultural research and development (R&D), irrigation, human capital, transportation) on poverty and growth in Vietnam, using a dynamic, computable general equilibrium (CGE) model for the period 2000-2015. To suit the research questions, the model keeps track of the accumulation of major assets that are broadly defined to include government spending, captures the impact of government spending on the demand side, and incorporates a poverty module. The policy experiments within the CGE framework are enhanced further by endogenizing productivity improvement, that are linked to changes in assets, in order to capture effects on both supply and demand sides. Productivity elasticities of GDP with respect to different types of government expenditure are estimated outside of the model to feed model parameters. Alternative experiments on government spending will be simulated to measure the impacts of the major types of public spending with a view to realising the Millennium Development goals by 2015.

1. Main research questions and core research objectives

The core research objective is to simulate alternative government spending strategies (various combinations of government spending on agricultural R&D, irrigation, transport, education and health care), quantify their impacts on poverty reduction and growth, and point out trade-offs of every strategy.

The main research questions:

- How much do alternative government spending strategies contribute to poverty reduction and growth?
- What are trade-offs and policy implications of each strategy?
- How does each functional type of government spending contribute to GDP growth?

2. Knowledge gaps and scientific contribution of the research

So far despite a substantial body of studies on impacts of economic reforms, trade liberalisation and private sector development on poverty reduction, studies on impacts of public spending on poverty reduction and growth have been fewer.

Some previous studies have focused on specific projects, such as Highway 5, between Hanoi and Haiphong (JBIC, 2003a) or the My Thuan Bridge in the Mekong river delta (AusAID, 2003). There have also been sectoral reviews, as in the case of the transport sector (World Bank, 2003a) and of rural investments (Mekong Economics Ltd., Vu Thieu and Janaiah Aldas, 2003).

Three studies, which have adopted a broader methodological framework to understand the links between public investment, growth and poverty reduction, are of JBIC (2003b), Fan et al (2004) and Rama et al (2004). A comprehensive methodological framework has been proposed by JBIC (2003b). This paper builds upon previous studies with an empirical dimension, reporting on their findings where appropriate. But it goes one step further by systematically exploiting data on investment in large-scale infrastructure across provinces, linking it to changes in poverty after controlling for the effects of other possible determinants of those changes.

The second study is conducted by Fan et al (2004) where impacts of public spending on education, roads, electricity, telephone, agricultural R&D and irrigation with respect to agricultural growth and poverty reduction is evaluated. The authors use a simultaneous equation model to track these different effects on agricultural growth and poverty.

A study by Rama et al (2004) assessed the poverty impacts of public investment employing three perspectives: (i) a macroeconomic perspective (decomposing impacts of public investment into incremental capital-output ratio (ICOR), investment rate, and elasticity of poverty reduction to economic growth); (ii) provincial perspectives (examining impacts of spending by province and by main sector); and (iii) individual project approach.

These three studies are very comprehensive, illustrating a wide range of analytical approaches for assessing impacts of public investment on poverty. However no one adopted an economy-wide approach which allows capturing interaction of various factors through direct, indirect and multiple-round effects over time. Furthermore, the existing studies do not contrast alternative government spending strategies, discussing their advantages and drawbacks for deeper evaluation.

With respect to overall GDP growth, we have not found empirical studies that evaluate impact of government spending on it, except the one by Fan et al (2004) mentioned above on agricultural growth.

This proposed research is an attempt to fill in the gap by using a CGE framework incorporating a poverty module to examine impacts (direct, indirect, multiple round, interaction) of several alternative government spending strategies on poverty reduction and growth. Elasticities of productivity with respect to government spending are also estimated outside of the model to endogenise productivity improvement via asset accumulation within the CGE framework.

3. Policy relevance

Poverty reduction has been an important component of the development objective and therefore always among the highest priorities of the Government of Vietnam. There are many ways of allocating government spending among sectors which affect poverty reduction substantially. Given the shortage of financial resources on one hand and numerous competing spending needs on the other hand, the government always has to face a difficult task of choosing desirable spending strategies to achieve growth and poverty reduction objectives. In particular, the government does not ascertain priori quantified impacts and trade-offs of a proposed spending strategy.

By simulating several alternative spending strategies and comparing with each other, the study could suggest policy-makers ways to choose better alternatives. The study will serve to back up policy decision on allocating government investment and spending, enhancing the efficiency of the resource use.

4. Methodology

To attain its objectives, the study attempts to explore two approaches: a dynamic computable general equilibrium (CGE) model to examine the impacts of public spending, and an econometric regression to estimate elasticity of GDP with respect to different types of government expenditure.

4.1. Dynamic computable general equilibrium model

A recursive dynamic CGE model includes a “within-period” module (a static CGE model), which defines the decisions in each time period, and a “between-period” module which updates the stocks of different endowments over time.

The within-period module includes *production sectors* that combine primary factors (labour, capital and land) with intermediate inputs to produce output for domestic market or exports. Other institutions are households, government and the rest of the world (ROW). *Household* income comes from factors and transfers from the government and ROW. The main items on the household spending side are direct taxes, consumption and savings. *The government* earns most of its incomes from direct and indirect taxes and spends it on consumption and investment. Government spending consists of consumption and investment.

Finally, the within-period block also includes *relationships defining productivity improvement*, similar to those of Lofgren and Robinson (2004). Endogenous changes in productivity in each period are induced by changes in labour, ‘composite’ capital stocks, including government current spending, government investment by functional spending area (e.g. irrigation, agricultural research and development, human capital (including health care and education), and transportation). These relationships are captured by various constant-elasticity functions linking the productivity improvement to different types of government expenditure. The elasticity parameters are factor- and function-specific, making it possible to specify different channels and magnitudes for the productivity effects of different types of government spending. By incorporation the linkages, this approach seeks to “endogenize” the process of technical change in the models, linking productivity growth to factors such as

R&D spending, and capital growth (human and physical). The standard approach is to assume that investment in “research”, “knowledge creation” or physical and social infrastructure affects “technical change”; where research, knowledge or infrastructure have elements of being public goods. Thus, government spending makes effects on both demand and supply sides.

The elasticities will be estimated separately and plugged into the model. Estimation approach is summarised in Sub-section 4.2.

The between-period module links the within-period modules by updating selected parameters (typically factor supplies, population, and factor productivity) on the basis of exogenous trends and past endogenous variables. The module includes equations that define the stocks of different assets: factors (land, labour, and private capital) and government capital stocks. All stocks are associated with specific institutions. This information is used to define the shares of each institution in total income of each factor and the interest payments of the government to the rest of the world.

Labour and land stocks are updated on the basis of exogenous trends. The accumulation of private and government capital stocks is endogenous, which in any given year depends on past stocks, new investment, and the depreciation rate. In the accumulation equation for government capital, real investment is broadly defined to include both current and capital spending.

The model also incorporates poverty indicators such as poverty rate (head-count index) and Foster, Greer and Thorberker (FGT) index, which are computed on the basis of a representative-household approach in a separate poverty module.

Alternative experiments on government spending will be simulated to measure the impacts of the major types of public spending as well as ascertain better allocation choices in terms of poverty reduction.

4.2. Estimation of elasticity of GDP with respect to different types of government expenditure

The study will follow the approach proposed by Fan and Rao (2003), who estimated a production function in the double-log form with national GDP as the dependent variable, and labor, capital investment, and various government expenditures as independent variables.

$$GDP_t = h(LABOR_t, K_t, KGE_{i,t}, W_t)$$

where GDP_t is GDP at year t

$LABOR_t$ and K_t are labor and private capital inputs at year t

$KGE_{i,t}$ is capital stock constructed from current and past government spending in the i th sector with $KARDEXP_t$ representing government stock in the agricultural R&D, $KIREXP_t$ representing government stock in the $KEDEXP_t$ representing the education sector, $KHEXP_t$ representing the health sector, and $KTCEXP_t$ representing the transportation.

W_t are the year dummies capturing other factors not included in the equations.

As the double-log form is used, the estimated coefficients will be elasticity of dependent variable (GDP) with respect to their independent variables (government spending by function and others).

Usually the capital stock cannot be observed directly. To construct a capital stock series from data on capital formation, we used the following formula:

$$K_t = I_t + (1 - \delta)K_{t-1}$$

where K_t is the capital stock in year t

I_t is gross capital formation in year t

δ is the depreciation rate.

5. Data requirements and sources

The study requires data compiled from several sources.

The CGE model requires a number of data sets. The first data set is input-output table or social accounting matrix for the Vietnamese economy. The former is published by the General Statistics Office (GSO) for 2000 (GSO 2003), while the latter was compiled and made public by Jensen et al (2004). The second set of data is living standards measurement survey, known in Vietnam as Vietnam Household Living Standards Survey conducted every two years. The third set is time-series data on public spending by functional area archived by Ministry of Finance.

For elasticity estimation, in addition to the data on public spending, time-series data on labour, capital input and capital stock are needed. Data on labour are available from the General Statistics Office or Ministry of Labour, Invalids and Social Affairs; while data on capital input and capital stock have to be constructed using various available data from official sources and some ad-hoc assumptions.

6. Dissemination strategy

As the Central Institute for Economic Management (CIEM), where the research team is based, is a think-tank of the government and of the Ministry of Planning and Investment (MPI), the research results will be disseminated through various channels in the most direct manner. MPI is the government body responsible for investment and ODA policies, as well as socio-economic development strategies and plans for Vietnam. CIEM and the research team therefore have the closest relationships with policy-makers in public spending policy.

The most common way to disseminate research results is workshops, seminars with participation of policy-makers, academics and the civil society to raise awareness of the research issue and to serve as arguments in policy debates and dialogs about efficiency, effectiveness of public spending, as well as pros and cons of different government spending strategies. The research findings will also be incorporated into draft of various policies that MPI is in charge, especially those on public investment. The findings will also be

substantially reflected in policy advice to government (that is a major duty of the CIEM) on how to use public spending efficiently and what are preferred government spending alternatives in certain circumstances. The research results will reach wider users through policy briefs.

Thanks to close relationship and wide formal and informal networks with policy makers, researchers, including those who are able to pick up good ideas from research findings instantly, it is hoped that the results of this research will reach those in charge of deciding on policy changes soonest.¹ Key partners of the team are Government, MPI, Ministry of Finance, Ministry of Agriculture and Rural Development.

The current proposal is a welcoming activity when MPI is in a process of preparing Public Investment Program for 2006-2010 where all large investment projects are being proposed and screened for approval. The key partners in this respect are the Department for General economic issues, sectoral Departments of MPI, as well as international multilateral and bilateral donors such as World Bank, ADB, and JBIC who are large donors for basic needs and infrastructure.

Dissemination of the research to fellow researchers is another aim of the study, especially when the CGE analytical framework is still quite new for national researchers. Key local partners in this respect are Institute of Policy and Strategy for Agriculture and Rural Development, Vietnam Academy of Social Sciences, Development Strategy Institute. Other forms of dissemination is posting the study on web site, or publishing it in various journals for a wider outreach.

The team leader has excellent past records of good collaboration and credibility with the MPI, when she has been working as a consultant in drafting of government reports such as “Vietnam Achieving the Millennium Development Goals” for the UN Summit in September 2005, annual progress report “Vietnam Growth and Reduction of Poverty” 2003-04 and 2004-05 for Vietnam’s annual Consultative Group meeting. She was in a team preparing report on “Review of Employment in Agriculture and Rural Non-Farm Activities” in respond to MPI request to ILO to help integrating employment strategy into Vietnam’s development plan 2006-10. For the time being she is a consultant studying WTO subsidy commitments by the Government and preparing guidelines for modifying Vietnam’s subsidy policy with a view of reducing adverse impacts while complying with the WTO commitments.

7. Short list of key references

AusAID, 2003. *My Thuan bridge impact monitoring study*. Presentation at workshop on Development of Large-Scale Infrastructure for Growth and Poverty Reduction, Australian Agency for International Development, Hanoi.

¹ It was the case with one previous study jointly conducted by Fan of IFPRI and the team leader (2004), when the study triggered a policy debate on high return of agriculture R&D vs. its low level of funding. The outcome was substantially higher planned funding for this activity in 2006-2010 by the Ministry of Agriculture and Rural Development.

- Cuddihy, Nguyen The Dung, and Pham Lan Huong, 2005. 'Agriculture and Rural Development Sector Expenditure'. Chapter 13 in Socialist Republic of Vietnam, World Bank, and Like Minded Donor Group *Vietnam Managing Public Expenditure for Poverty Reduction and Growth: Public Expenditure Review and Integrated Fiduciary Assessment 2004*, Financial Publishing House, Hanoi.
- Pham Lan Huong, Bui Quang Tuan, and Dinh Hien Minh, 2003. *Employment Poverty Linkage and Policy for Pro-poor Growth in Vietnam*. Issues in Employment and Poverty, Discussion Paper 9, Recovery and Reconstruction Department, Geneva.
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- Jensen, J. Rand, F. Tarp, Pham Lan Huong, and Dinh Hien Minh, 2004. *A New Social Accounting Matrix for the Year 2000*. Hanoi, Science and Techniques Publishing House. Poverty Task Force (including Pham Lan Huong), 2002. *Localizing MDGs for Poverty Reduction in Vietnam: Enhancing Access to Basic Infrastructure*. Hanoi.
- Lofgren, H., and Robinson, S., 2004. *Public Spending, Growth, and Poverty Alleviation in Sub-Saharan Africa: A Dynamic General Equilibrium Analysis*, Draft.
- Mekong Economics Ltd., Vu Thieu, and Janaiah Aldas, 2003. *Poverty impacts of public irrigation spending in Vietnam*, Manuscript in preparation, Hanoi.
- Nguyen Thang, and Pham Lan Huong, 2004. *Promoting Rapid, Sustainable and Pro-poor Economic Growth for Achieving Millennium Development Goals in Vietnam*. ILO-SIDA-UNDP Report, Hanoi.
- Papola, Pham Lan Huong, Nguyen Thi Lan Huong, and Ngo Xuan Quyet, 2005. *Integrating Employment Strategy into Vietnam's Development Plan 2006-2010*. Report Prepared for ILO, Hanoi, 2005.
- Pham Lan Huong, 2000. *"Impacts of Trade and Investment Policy on Income Distribution in Vietnam Using a General Equilibrium Framework"*. Unpublished Ph. D. Thesis, ANU, Canberra.
- Pham Lan Huong, 2003. *The Impact of Vietnam's Accession to the WTO on Income Distribution Using a General Equilibrium Framework*. Working Papers 03-7, Asia Pacific School of Economics and Government, the Australian National University, Asia Pacific Press.
- Pham Lan Huong, Vu Quoc Huy, Bui Quang Tuan, Trinh Quang Long, Pham Huong Giang, and Tran Binh Minh, 2004. *Measuring Economy-Wide Impacts of International Integration on the Vietnamese Economy, Using a Computable General Equilibrium*

Framework and Policy Implications (in Vietnamese only). Report Prepared for SIDA, Hanoi.

Rama, Larsen, and Pham Lan Huong, 2004. *The Impact of Infrastructure Development on Rural Poverty Reduction in Vietnam. A Case Study from Reducing Poverty, Sustaining Growth. What Works, What Doesn't, and Why: A Global Exchange for Scaling Up Poverty Reduction Success: A Global Learning Process and Conference* Shanghai, May 25-27, 2004.

8. List of team members' prior training and experience in the issues and techniques involved

Pham Lan Huong, 48 years old, female, senior researcher, PhD. in economics. Ph.D. dissertation "Impacts of Trade and Investment Policy on Income Distribution in Vietnam Using a General Equilibrium Framework", completed in 2000. The thesis investigates impact of the current trade and investment policies (including government expenditures) on the size distribution of income in order to clarify how and to what extent the implementation of these policies affects the achievement of the government objective of growth with equity. The issue is examined by using a computable general equilibrium (CGE) model of Vietnam, which is developed by the author. She carried out various studies using CGE framework. She is also an expert in poverty reduction and public expenditure issues.

Tran Binh Minh, 27 years old, female, researcher, master in Economics of Development.

1. Training courses

- - Computable General Equilibrium Modelling, Thai Land Development Research Institute, 20-26 March 2005, Thailand
- - Project Monitoring and Evaluation, The Microfinance Resource Center, March 2001, Hanoi, Vietnam.
- - Delinquency Management and Setting Sustainable Interest Rate, The Microfinance Resource Center, September 2000, Hanoi, Vietnam.

2. Related experience

- *October 2004 – November 2004*: Research Assistant for Identification Mission for Vietnam – Belgium Credit Project on "Strengthening of institutional capacity of the Vietnam Women's Union in management of credit and savings programmes in favour of poor rural women"
- *October 2003 – March 2004*: Researcher for Vlaamse Interuniversitaire Raad, Flemish Interuniversity Council, Belgium on a co-research project "Operational and Institutional Obstacles for the Efficacy of Micro Credit Programs for Poverty Reduction in Vietnam"

- *November 2002 – July 2003*: Research Assistant for TA 3741 “Preparing the Framework for Microfinance Development” funded by the Asian Development Bank.

Nguyen Anh Duong, 24 years old, male, young researcher, bachelor in Economics.

Prior experience:

- CGE modelling in the course *Macroeconomic 2* (Australian National University)
- CGE training course at the Institute of Agricultural Economics, Ministry of Agriculture and Rural Development

9. **Expected capacity building**

For the *team leader*: this is the first study that she works with dynamic CGE and poverty module.

For the *team members*: this is the first research for the youngest researcher (Duong) using a CGE model, and the third CGE-applying study of the other member (Minh) when they could learn rigorously how to use the techniques, from compiling data, modifying model, implementing model, running simulation, correcting for errors, writing the report under the supervision of a senior researcher. These activities are essential for them in future research activity. Furthermore, they are involved in one of the most important focus of the ministry that they work for: public spending and allocation issue.

Task assignment:

Team leader: overall responsibility, guidance and supervision over each activity, model construction, preparing policy simulations, writing the policy analysis, result interpretation, and other miscellaneous parts of the report.

Nguyen Anh Duong: data compilation, learning model construction, learning to run simulation and interpretation of the results, writing the section on data compilation.

Tran Binh Minh: data compilation, model construction, learning to run simulation and interpretation of the results, writing the section on theoretical model structure, learning to write result interpretation.

10. **Any ethical, social, gender or environmental issues or risks which should be noted**

No noteworthy risk

11. **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)**

- Vietnam Poverty Update Report, the first poverty assessment report that is carried out by Vietnamese researchers. The financial support provided by the World Bank, 2005-06. Pham Lan Huong, Tran Binh Minh.
- Large-scale computable general equilibrium model and various policy analyses for Vietnam; the activities commissioned by CIDA to Thailand Development Research Institute (TDRI). 2005-06. Pham Lan Huong, Tran Binh Minh.
- “Effects of Major Macro and Investment Policies on Poverty Reduction in Rural Vietnam” funded by International Food Policy Research Institute in Washington DC. 2004-05. Pham Lan Huong.
- “Measuring Economy-Wide Impacts of International Integration on the Vietnamese Economy, Using a Computable General Equilibrium Framework and Policy Implications” for a SIDA-funded project on Policy Research Capacity Strengthening to Implement Vietnam 2001-2010 Socio-Economic Development Strategy. 2003-04. Pham Lan Huong, Tran Binh Minh.
- World Bank study “Assessing the Impact of Public Spending in Vietnam”. The study focuses on analysing the growth and poverty impacts of different types of public spending in Vietnam, and quantifies any tradeoffs or complementarities between these goals. 2003. Pham Lan Huong.
- World Bank research project “Integration and Poverty”. 2001-02. Pham Lan Huong.
- “Vietnam’s International Economic Integration and its Impacts on Employment, Income and Income Distribution”. The project is funded by the East Asian Development Network. 2001-02. Pham Lan Huong.

Additions and augmentations in the revised proposal pro-pep-10602

I would like to thank the anonymous reviewer for his constructive comments that I have taken into account while revising the proposal. In particular, the following revisions have been made:

Responding to **the first question**, I explicitly incorporated the transmission mechanisms of changes in government spending to major functional areas to productivity improvement via endogenising productivity functions in the CGE model to capture the efficiency effects.

With regard to **the second question**, I made the types of spending more specific for agriculture (agricultural R&D, and irrigation). As the greatest advantage of any CGE model is capability to capture inter-linkages among agents/sectors/areas in the economy and to simulate a combination of policy measures at one time, I feel regrettable to focus just on one. We still have to estimate impacts of all major government spending out of the CGE model anyway, so it is worth to do for the others, even we have to work harder. It may even be more rewarding to do so with respect to policy relevance. But if the reviewing committee decides that I should just focus on one sector (for example agriculture), I do not mind.

To take into account **the third question**, where I made revision of my research objective and research questions accordingly. I fully agree it may be not cautious to determine a prioritisation given all positive and negative features of a spending strategy, as well as uncertainty about accuracy of simulation results. That is why I modify the research objective and questions to make them more advisable.

I fully agree with **the last question** raised by the reviewer and already clarified the way I would make the model recursiveness work.