Channel Decomposition Analysis

The Impacts of Trade Liberalization to Economic Growth with The Case of Vietnam

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VDF-Tokyo, GRIPS 26 April 2008

Outline

1. Research objectives
2. Analytical framework
3. Model specifications
4. Data and estimation method
5. Results and conclusions

1. Research Objectives

- Trade and growth nexus – debates and agreements
- Relation of trade liberalization and growth in Vietnam

Trade-Growth Nexus: Debates

- **Immiserizing growth:**
  - **Specialization in primary exports is bad for growth**
  - **While trade openness promoted convergence in the 1960s and 1970s, since 1980s the benefits of trade accrued mostly to the rich economies, with little benefit to the less developed economies.**
  - **Most of dynamic benefits of trade are obtained through productivity growth, with a small contribution coming through increased investment.**
- **Small benefit of trade:**
  - **Simple Harberger triangles identify losses from trade restrictions larger than 2% of GDP.**
  - **However, several reasons for expecting more benefits of free trade (imperfect competition, increasing returns, efficiency gains) can double or treble the estimated GDP effects.**
- **Difficulties in measurements:**

Difficulties in Measurements

- **Trade liberalization indicators**
  - **Trade outcome: trade/GDP (Baldwin, 1989), import penetration, deviation of trade volume from predicted value (Balassa and Bauwens, 1987)**
  - **Import tariffs: simple average, trade weighted, peak, dispersion, ERP**
  - **NTBs : percentage of country's tariff line items are covered by NTBs (UNCTAD, IMF-TRI, WB), tariff equivalent of import restriction (Nash, 1993), Sachs and Warner (1995)**
  - **Black market premium, coefficient of variation of the BMP**
  - **Index of relative price distortions: distortions of relative prices of tradables and nontradabes, national account price index**
- **Trade – growth linkages:**
  - **Exogenous variables (population, land, distances, geographic characters may influence health, endowments or institutions) affect both trade and growth**
  - **Other good policies (investment, effective conflict resolution, human capital accumulation) combine with liberal trade policy.**
  - **Growth theory is too open to be adequately tested.**
  - **Case studies find a wide variety of causes and channels for growth.**

Trade-Growth Nexus: Agreements

- **Openness matters (Sachs and Warner: 1995):**
  - **During 1970-89, open economies outperformed closed economies on three main dimensions: economic growth, avoidance of extreme macroeconomic crises, and structural change (and export structure).**
  - **Conditional convergence is as expected with the negative relation between growth and initial income, positive effects of educational attainment, positive effects of the investment-to-GDP ratio, and negative effects of measures of political instability.**
  - **Being open to international trade has been sufficient to achieve growth in excess of 2 percent for developing countries.**
- **Trade, growth and poverty (Dollar and Kraay: 2004, 2002, 2001):**
  - **More than half of developing countries have increased trade and decreased tariff (globalizers) greatly during the globalization wave. They are catching up with the rich countries while the other (non-globalizers) is falling farther behind.**
  - **The increase in growth rate leads on average to proportionate increase in income of the poor. So globalization in general leads to faster growth and poverty reduction in developing countries.**

Relation of Trade Liberalization and Growth in Vietnam

- **Nguyen, Ezaki (2007, 2005): using CGE model and database of GTAP 6.0 and showing the positive impact of different regional economic integration (AFTA, China-AFTA, EA, APEC, world) to welfare and income distribution in VN but negative to trade and fiscal balance.**
- **Fukase, Martin (1999): using GTAP 4.0 and revealing the static economic benefits of AFTA (IL and TEL 2003 for ASEAN 5 and 2006 for VN, plus SL 2010 for ASEAN 5 and 2013 for VN, plus GEL, plus non-discrimination to ROW while APEC the same, 2.3% tariff reduction of all APEC). They suggest that when VN extends its AFTA commitments to all trading partners, VN's welfare increases substantially. Their modeling framework did not incorporate they dynamic effects of trade liberalization, effects of NTBs, and export promotion measures.**
- **Dollar (2002): using time series (1991-2003) analysis and asserted that trade liberalization in VN accounts for 1.3% point in growth and total effect of controlling variables (trade liberalization, disinflation, financial deepening, property right reform) would increase growth by 7.2% point.**

2. Analytical Framework

- **Dynamic gains from trade openess to economic growth**
- **A framework of contribution from trade liberalization to economic growth through channels in Vietnam**

Dynamic Gains from Trade to Growth (Wacziarg 2001)

- **Measuring of trade policy openness:**
  - **Regression of openness on country-specific factors: per capita income, land, population, import tax, pre-Uruguay Round NTBs, and Sachs/Warner trade liberalization index**
  - **Weighted average of several indicators: tariff revenues, NTBs, and an indicator of overall outward orientation**
- **Measuring the impacts of trade policy openness to growth through channels**
  - **Government policy: more disciplined types of macroeconomic management reduces price uncertainty, encourage factor accumulation and moderating public deficit and debt levels**
  - **Allocation and distribution: specialization according to comparative advantages and new firms entry in export markets, increased degree of market competition allows economies to better capture the potential benefits of increasing returns to scale**
  - **Technological transmission: imports of necessary capital goods for capital formation and domestic investment, especially through FDI and technological spillovers**

A Framework of Contribution:
Government Policies

- **Channel 1: Government consumption**
  - **Government consumption accounts for about 7% of GDP, 25% of total state budget expenditure, of which 28% spent for investment, and other for current expenditures.**
- **Channel 2: Macro-economic management**
  - **Budget deficit: about 4% of GDP (excl. lending amortization); state's main revenues come from oil revenue, SOEs, and import-export tax**
  - **Indebtedness: State debt was financed mostly through domestic banking system (by uses of cash balances) while external indebtedness (mostly by long-term public guaranteed) was piled up.**
  - **Hyper-inflation at the beginning of economic reform (874.7% at Dec. 1986) was controlled but price levels incline to go up lately as a result of monetary, especially the FDI inflows and cost-push inflation.**

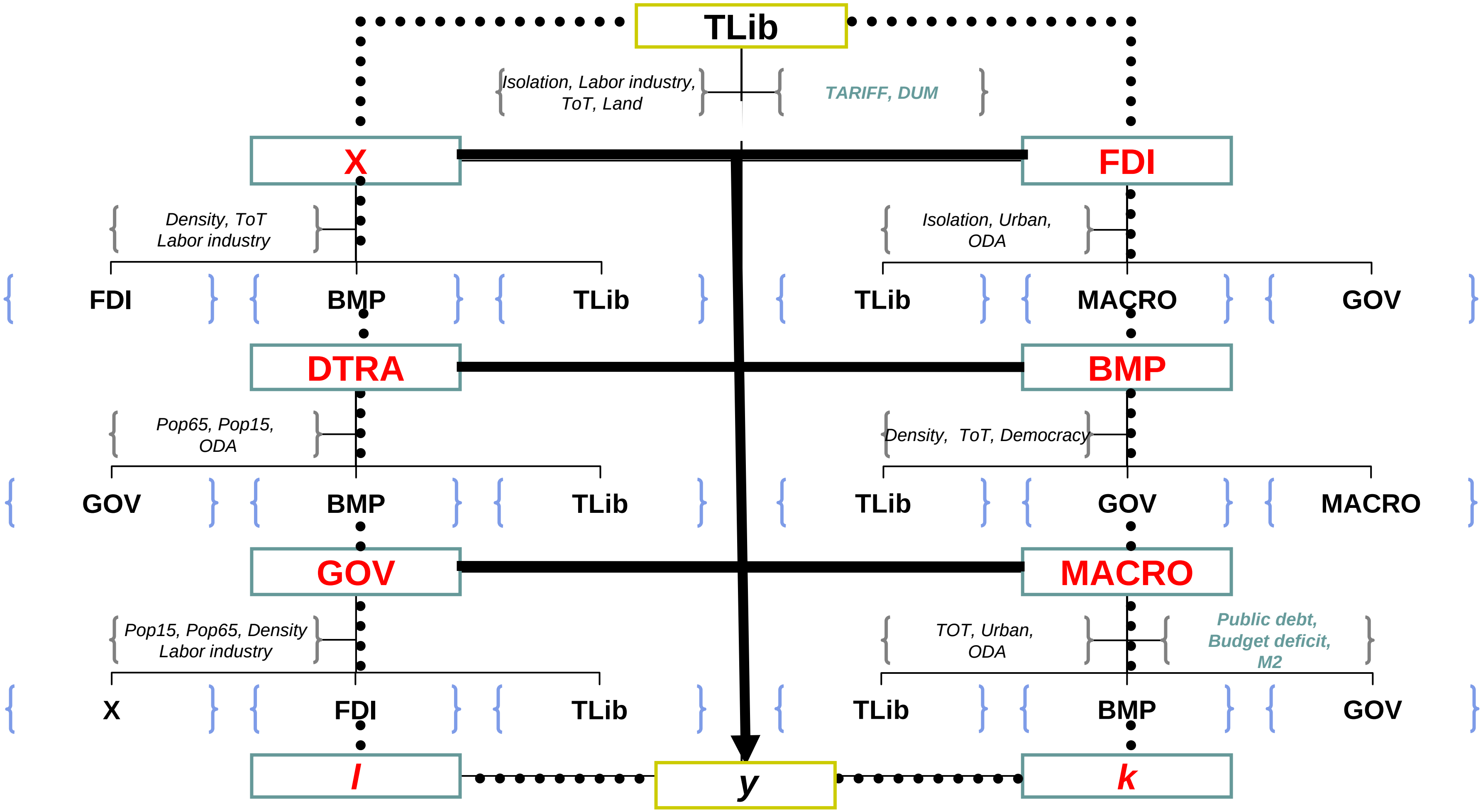
A Framework of Contribution:
Domestic Allocation and Distribution

- **Channel 3: Black market premium:**
  - **Managed floating system applied since 1989, replacing multi exchange rate system (commercial, non-commercial, internal for SOEs, and remitances) by the unified one but determined by SBV, then determined in the inter-bank transactions since 1991, no surrender requirements for exchange since 2006.**
  - **Under the firm control of SBV, BMP was narrowed and therefore captures the effect of monetary and exchange rate policy rather than trade policy.**
- **Channel 4: Domestic retail trade:**
  - **Flows of goods in the domestic market changed from centrally state-managed to dominantly private with foreign participated (since 1994) distribution system.**
  - **Retail trade value in domestic soared after 1986 and then grew steadily on average at 17.2% annually since 1994.**

A Framework of Contribution:
Technology Transfer

- **Channel 5: Exports (X)**
  - **Vietnamese structure of exports is shifting from primary exports to light manufacturing**
  - **Increasing new potential high-value exports beside high-quantity (crude oil, rice, and coal)**
  - **Raised the most country's foreign revenue, scheduled to swamp imports by 2010.**
- **Channel 6: Foreign direct investment (FDI)**
  - **Increased rapidly after Vietnam opened up the economy, peaked in 1996, then withdrew in 1997, and now is recovering.**
  - **Three forms of FDI are currency, physical machinery, or industrial know-how**
  - **Forms to carry out projects are JVs, BCC, BOT, BTO, BT, EPZ, IZ with resources of Vietnamese counter partners**
  - **Since 2003, FDI's industrial output and exports has outweighed the state sector.**

Channel Analysis Framework



3. Model Specifications

- Estimation of trade liberalization index (Tlib)
- Linking the channels to economic growth
- Modeling the transmission channels

Estimation of Tlib

Constructing Weights

- **Trade liberalization policy focuses on the import tariff reduction and NTBs removal, which prominently covered by the list of commodities under the import quotas and licenses system.**
- **Changing tariff levels can alter trade flows and resources allocation effects by raising domestic prices of import-competing industries relative to exportable, or in other words, by changing the relative opportunity costs. Proxy of tariff is tariff revenue.**
- **NTBs: trade flows antecedes the protectionism other than tariff which primarily affected by the government trade reform policy**

Estimation of Tlib

Export or Import-led Productivity Growth?

Thangavelue and Rajaguru (2004):

- **Imports are an important channel for foreign technology and knowledge into the economy. Exports of labor-intensive goods can fill the foreign exchange gap and finance import of appropriate technology into domestic economy. Competition in export markets also lead to greater efficiency as local firms face greater competition.**
- **However, in the long run, no causal effect from exports to labor productivity growth (even at the manufacturing sector) but causal and positive effect from imports to labor productivity growth in almost countries.**

Estimation of Tlib

Specifications for Index

- **Import dependence ratio depends on income, tariff, and non-tariff barriers (NTBs)**

$$(1) M = \beta_1 + \beta_2 * INCOME + \beta_3 * TARIFF + \beta_4 * DUM$$

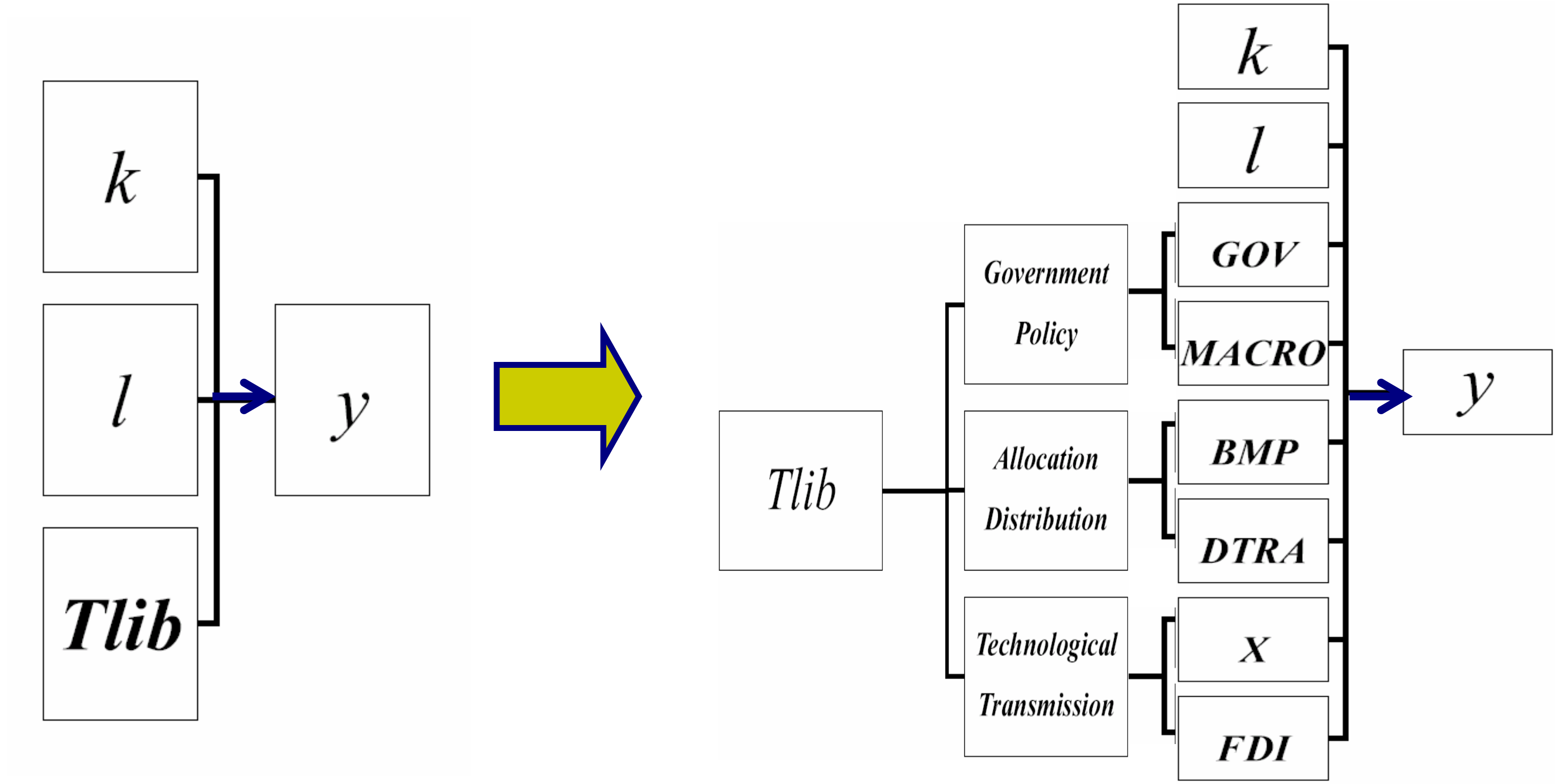
- **Trade liberalization index (Tlib) reflects the change in tariff and NTBs**

$$(2) Tlib = \hat{\beta}_3 * TARIFF + \hat{\beta}_4 * DUM$$

Linking the Channels to Economic Growth

- **Incorporating variables to growth equation**

$$(3)\; y = f(k, l, GOV, MACRO, BMP, DTRA, X, FDI)$$



Linking the Channels to Economic Growth

- **Modeling the Transmission Channels**
  - **Government policy channel**

    $$(4) GOV = f(Tlib, FDI, MACRO)$$

    $$(5) MACRO = f(Tlib, BMP, GOV)$$

  - **Allocation and distribution channel**

    $$(6) BMP = f(Tlib, FDI, MACRO)$$

    $$(7) DTRA = f(Tlib, BMP, X)$$

  - **Technological transmission channel**

    $$(8) X = f(Tlib, BMP, MACRO)$$

    $$(9) FDI = f(Tlib, GOV, BMP)$$

4. Data and Estimation Method

- Modification and data of the main variables
- Estimation method
  - OLS and 3SLS?
  - Modifications of instruments
  - Data of instrumental variables

Modifications of Main Variables

Wacziarg's model

- Data:
  - 57 countries (OECD, Asia, Latin America, Africa) 1970-1989, divided into 4 periods (70-74, 75-79, 80-84, 85-89)
- Trade policy openness index
  - Trade openness: imports plus exports/GDP
  - Independent variables: growth of per capita income, log of initial income, log of land area, log of population, policy indicator
  - Policy indicators: tariff revenues/total imports, non-tariff barriers (Pre-Uruguay Round, Sachs/Warner liberalization status)
- Government policy
  - Macro-economic policies: public debt/GDP, deficit/GDP, growth of M1 net of growth rate
  - Size of government: Gov. consumption/GDP
- Allocation and distribution
  - Price distortions: black market premium
  - Factor accumulation: domestic investment rate
- Technological transmission
  - Transformation in the product composition: manufactured exports/total exports
  - Foreign direct investment as a share of GDP

Modifications for Vietnam

- Data:
  - Vietnam 1986-2006
- Trade liberalization index
  - Import liberalization: imports/GDP
  - Independent variables: income, policy indicators.
  - Policy indicators: tariff revenues, non-tariff barriers
- Government policy
  - Macro-economic environment: public debt/GDP, deficit/GDP, growth of M2 net of growth rate
  - Size of government: Gov. consumption/GDP
- Allocation and distribution
  - Price distortions: black market premium
  - Extent of market and the participation of private sector
- Technological transmission
  - Transformation in the product composition of exports
  - Foreign direct investment's share in industrial output

Data of Main Variables

- M: Imports dependence ratio, at VND constant price
- TARIFF: Ratio of tax revenue/imports, tax revenue deflated by GDP deflator
- DUM: Trade liberalization status, 1 for 2000-2005, and 0 for the other
- INCOME: Growth rate of income per capita, at constant VND 1994 price
- y: Growth rate of GDP, GDP at constant VND 1994 price
- k: Growth rate of gross capital formation, at constant VND 1994 price
- l: Annual growth rate of employed labor forces
- GOV: Share of government consumption out of total consumption, at constant VND 1994 price
- MACRO: composite index of z1, z2, z3
- z1: Ranking across the years of ratio of public debt out of GDP, public debt at current VND and deflated by GDP deflator; z2: Ranking across the years of ratio of budget deficits out of GDP; z3: Ranking across the years of growth of M2 net growth rate, M2 at VND current price and deflated by GDP deflator
- BMP: parallel market rate minus official rate/official rate as a percentage
- DTRA: Share of non-state sector retail sales in GDP, at current VND price deflated by GDP deflator
- FDI: Foreign direct investment's share of industrial output, at constant VND 1994 price
- X: Manufactured (heavy industry) exports, share of total export volume, at current USD

Estimation Method

- **Ordinary least squares (OLS):**
  - **Estimation with the assumption of data are normally distributed and uncorrelated with the residuals in the equations in the system**
- **Three stage least squares (3SLS):**
  - **Data are not normally distributed and correlated with residuals in the equations in the system.**
  - **Parameters of the structural model are estimated jointly:**
    - **Rewriting every endogenous variable as a function of all the exogenous variables in the system in the model's reduced form and estimating by OLS. The fitted values of each endogenous variables will be the corresponding instruments.**
    - **Estimating each equation in the structural model separately through the instrumental variables.**
    - **Employing the covariance matrix for the error terms of the model as a weighing matrix as well as the instruments derived in the first stage to jointly estimate the equations using instrumental variables-generalized least squares.**

Modifications of Instruments

Wacziarg's model

- Trade policy openness index
  - Island dummy, log of land area, terms of trade shocks, log of pop.
- Growth equation
  - Male human capital, female human capital
- Government policy
  - Government consumption: Log pop., pop. density, pop. over 65, pop. under 15
  - Macro policy quality: terms of trade shocks, ethnolinguistic fractionalization
- Allocation and distribution
  - Price distortions: democracy index, terms of trade shocks, pop. density
  - Domestic investment: pop. over 65, pop. under 15, ethnolinguistic fractionalization
- Technological transmission
  - Manufactured exports: Log pop., pop density
  - FDI: island dummy, postwar independence

Modifications for Vietnam

- Trade liberalization index
  - Isolation, labor industry, terms of trade shocks, land under cereal production
- Growth equation
  - Male labor force, female labor force, school, land, isolation, density, tot, ODA
- Government policy
  - Government consumption: population over 65, population under 15, labor industry, density
  - Macro policy quality: terms of trade shocks, urban, ODA
- Allocation and distribution
  - Price distortions: terms of trade shock, population density, democracy
  - Domestic retail sales: population over 65, population under 15, ODA
- Technological transmission
  - Manufactured exports: density, population, terms of trade shock, land
  - FDI: isolation, urban, ODA

Data of Instrumental Variables

- Trade liberalization index:
  - Isolation: number of telephone lines per 1000 pers
  - Labor industry: growth rate of industrial labors
  - Terms of trade shocks: growth of export price net growth of import price, index at constant 1994
  - Land: growth rate of land under cereal production
- Growth equation:
  - Male labor force: share in total labor force
  - Female labor force: share in total labor force
  - School: growth rate of total grade pupils
  - Land: growth rate of land under cereal production
  - Density: nation population density
  - ODA: growth rate of ODA, in USD converted to VND and deflated by GDP deflator
  - Terms of trade, isolation
- Government consumption:
  - Population over 65: share in total population
  - Population under 15: share in total population
  - ODA, labor industry
- Macro policy quality:
  - Urban: share of urban population in total population
  - Terms of trade shocks, ODA
- Price distortion:
  - Terms of trade shocks, density, democracy: number of students at universities and colleges
- Domestic retail sales:
  - Population over 65, population under 15, ODA
- Manufacture exports:
  - Density, labor industry, terms of trade shocks
- FDI:
  - Isolation, urban, ODA

5. Estimation Results (by OLS)

Coeffs.	(1) IMPORTS	(3) y	(4) GOV	(5) MACRO	(6) BMP	(7) DTRA	(8) X	(9) FDI
Const.	22.228***	-11.318**	6.949***	-14.703*	787.477***	-14.966*	11.532***	-62.546***
t-stat	*3.036*	*-2.107*	*19.069*	*-1.653*	*6.600*	*-1.893*	*2.730*	*-6.929*
INCOME	4.319**							
t-stat	*2.345*							
TARIFF	-0.530							
t-stat	*-0.448*							
DUM	31.942***							
t-stat	*4.022*							
Tlib			-0.030***	0.123***	-2.009**	0.236***	-0.060	0.271***
t-stat			*-3.437*	*3.199*	*-1.950*	*6.940*	*-0.885*	*3.474*
k		0.033						
t-stat		*0.975*						
l		0.112						
t-stat		*0.410*						
GOV		0.961**		2.493***	-87.019***	5.534***		8.779***
t-stat		*2.097*		*2.796*	*-6.223*	*6.985*		*8.306*
MACRO		0.102			11.909**			
t-stat		*0.638*			*2.424*			
BMP		-0.015*		0.022**		0.025***	-0.011	
t-stat		*-1.720*		*2.424*		*3.121*	*-0.871*	
DTRA		0.364***						
t-stat		*3.232*						
X		0.166**	-0.012					0.795**
t-stat		*2.231*	*-0.391*					*2.140*
FDI		-0.345***	0.094***				0.709***	
t-stat		*-3.964*	*3.609*				*6.126*	

Estimation Results (by 3SLS)

Coeffs.	(1) IMPORTS	(3) y	(4) GOV	(5) MACRO	(6) BMP	(7) DTRA	(8) X	(9) FDI
Const.	37.603***	-16.920	5.095***	-96.594***	1238.741***	-31.931	18.475***	-141.701
t-stat	*3.783*	*-1.042*	*14.431*	*-2.596*	*3.996*	*-0.490*	*4.241*	*-1.556*
INCOME	10.618							
t-stat	*1.647*							
TARIFF	-6.615**							
t-stat	*-2.455*							
DUM	7.044							
t-stat	0.259							
Tlib			-0.016**	0.118**	-4.768	0.401***	0.026	0.369*
t-stat			*-2.139*	*2.150*	*-1.454*	*2.989*	*0.648*	*1.859*
k		-0.111						
t-stat		*-0.746*						
l		1.017						
t-stat		1.122						
GOV		0.749		11.420***	-189.779**	8.999		21.418
t-stat		*0.576*		*3.149*	*-2.476*	1.430		1.519
MACRO		-0.322			34.717			
t-stat		*-0.610*			*1.427*			
BMP		-0.013		0.083****		0.054	-0.026**	
t-stat		*-0.412*		*2.483*		0.869	*-2.350*	
DTRA		0.715*						
t-stat		*1.672*						
X		0.154	0.162***					-0.650
t-stat		0.577	*3.344*					-0.240
FDI		-0.405**	-0.054				0.549***	
t-stat		*-2.274*	*-1.514*				*6.167*	

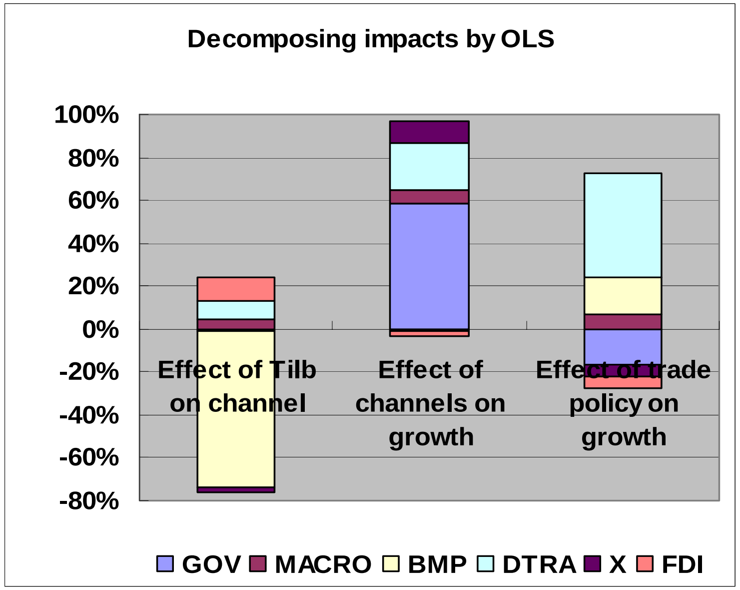
Impacts to Growth (by OSL)

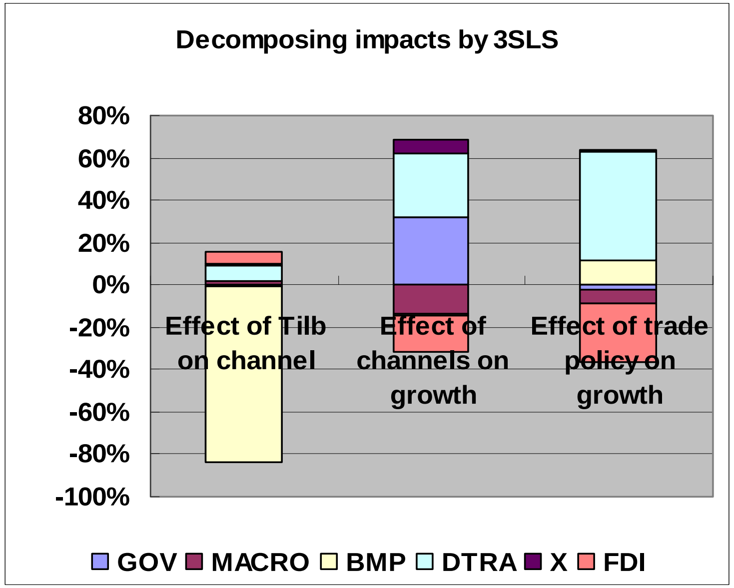
Channel variables	By OLS		
	Effect of liberalization on channel	Effect of channels on growth	Effect of liberalization on growth
GOV	-0.030	0.961	-0.029
MACRO	0.119	0.102	0.012
BMP	-1.955	-0.015	0.029
DTRA	0.236	0.364	0.086
X	-0.060	0.166	-0.001
FDI	0.286	-0.345	-0.001
Trade liberalization increases growth			0.079

Impacts to Growth (by 3SLS)

Channel variables	By 3SLS		
	Effect of liberalization on channel	Effect of channels on growth	Effect of liberalization on growth
GOV	-0.016	0.749	-0.012
MACRO	0.118	-0.322	-0.038
BMP	-4.768	-0.013	0.062
DTRA	0.401	0.715	0.287
X	0.026	0.154	0.004
FDI	0.369	-0.405	-0.150
Trade liberalization increases growth			0.153

Decomposing Impacts





- **The impacts of there channels are quite similar between OLS method and 3SLS method. Taking into accounts more factors doubled the overall impacts of trade liberalization to economic growth in Vietnam.**
- **Trade liberalization contributed most to the growth through DTRA and BMP channels (allocation and distribution impacts).**

Interpretation of the Results

- **The estimation results are statistically significant for most of variables and the sign of coefficients are reasonable.**
- **Trade liberalization reduces government consumption and black market premium while enhance macro management quality, encourage the private participation in domestic trade, and FDI.**
- **More government consumption and private participation help the economy growth, while BMP impinges the economy. Theoretically, better MACRO and higher X and FDI would raise growth, however, the results revealed the different impacts from trade liberalization to those channels and hence, different impacts to growth .**

Preliminary Conclusions

- **The increased efficiency in allocation and distribution has been the major transmission of the trade liberalization impacts on growth in the period 1986-2004 .**
- **In overall, import liberalization increases economic growth in both OLS and 3SLS estimation methods (by 0.079 and 0.153 percentage point, respectively) .**

Policy Implications

- Industrial exports and FDI should go together to positively contribute to economic growth so that the impacts of import liberalization to growth would have been bigger.
- Trade liberalization will enhance the efficiency in the economy, therefore the most important function of the government is to reserve a healthy macro economic environment, especially a prudent the exchange rate policy.

Thank you very much for your attention!