

Can Vietnam's Economic Growth be Explained by Investment or Export: A VAR Approach

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Pham Thi Mai Anh, MA.

Lecturer – Diplomatic Academy of Vietnam, MOFA

Outline

- Research Motivation
- Literature Review
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- Empirical Results
- Conclusion and Policy Implications

Research Motivation

- Vietnam: one of the fastest growing and most dynamic Asian economies (ADB's reports, 2003).
- Impressive record of GDP growth rates:
 - Averaged at 5 % during the mid-1980s
 - Averaged at 9% during the mid-1990s.
 - Hit 8.5% in 2007

Research Motivation

- Launch of Doi Moi in 1986 and accelerated international economic integration since 1992 said to have triggered Vietnam's economic growth (ABD's report, 2003).
 - Economic transformation
 - Economic and legal reforms
 - BTAs with major economies: EU, Japan, US
 - Membership to ASEAN, AFTA, APEC and WTO
- => A boom in investment and export over 20 years

Research questions

- Has Vietnam's economic growth over the past two decades been driven by export?
⇒ 1st hypothesis: Vietnam's export-led economic growth
- Or driven by investment?
⇒ 2nd hypothesis: Investment-led economic growth
- Any other factor like productivity linking investment or export with economic growth?

Research Motivation (cont)

- Several domestic researchers and international reports (e.g., Giang Thanh Long & Nguyen Khac Minh, 2007, IMF's, 1999) have indicated investment and exports as main engines pushing Vietnam's economy.
- Only a few domestic empirical studies (Pham Thu Hien, 2008, Long & Hieu, 2007, Le Viet Anh, 2005) analysing the economy's determinants.
- But... no empirical study conducted to determine investment or export as the major engine behind Vietnam's economic growth.

Literature Review

- Decomposing economic growth is a “hot” research topic over two decades:
 - Group 1: investigate export and economic growth correlation and export-led economic growth hypothesis (Feder, 1983; Kavoussi, 1982; Michaely, 1997; Ram, 1987; Tyler, 1981...)
 - Group 2: determine investment –led economic growth hypothesis (export is the linkage or vice versa)(Baldwin and Seghezza, 1996; Herrerias and Orts, 2007; Rodick, 1995...)

Literature Review (cont)

- Empirical procedures and conclusions on the two hypotheses have varied among the studies and periods of time.
- Late 1970s and early 1980s, cross-section econometric studies found a strong export-economic growth correlation without concluding if it is causal due to the econometric procedure's shortcoming.
- Mid-1980s, early 1990s, time-series data used for empirical investigations on export-led growth, showing both positive and reverse causality between export and economic growth.
- Recently, VAR used to test 2 alternative hypotheses: export-led and investment led-growth as well as explore the mechanism of the two elements linked.

Vector Auto-Regression (VAR) Methodology

- This study follows the reduced-form structural VAR models employed by Bradford and Charwin (1993)
- Four variables used:
 - GDP (Y): real GDP
 - Investment (I): total investment (private sector's, state-owned sector's investment and FDI)
 - Export: export revenue
 - Productivity: industrial sector's value per labour
- Two VAR models developed separately to investigate the two hypotheses: export-led and investment-led growth.

VAR model of export-led growth

- 4 equations regressed under VAR technique:
 - (1) $X = u_1$
 - (2) $I = \beta_1 Y + \beta_2 X + u_2$
 - (3) $D = \beta_3 I + \beta_4 X + u_3$
 - (4) $Y = \beta_5 D + \beta_6 X + u_4$
- Export treated as exogenous variable to impact all other variables of the model, but these variables are not allowed to interact with export.
- Or export assumed to be the only factor directly drive the whole economy but no shocks from the three variables directly affecting export.

VAR Model of Investment-led Growth

- 4 equations regressed under VAR technique:
 - $I = u_1$
 - $D = \beta_1 I + u_2$
 - $Y = \beta_3 I + \beta_4 D + u_3$
 - $X = \beta_5 I + \beta_6 D + \beta_7 Y + u_4$
- Investment treated as exogenous variable that disturb all other three variables but no interactions from these variables to investment are expected

**Why was Bradford and Charwin's
empirical procedures exactly
followed in my study?**

Vector Auto-Regression (VAR) Methodology (Advantages)

- I share the same research target with the two authors.
- Availability of the data of four variables: export, total investment, industrial productivity and GDP.
- VAR methodology can examine hypotheses built on no theoretical base.
- VAR methodology can lively show the interactions among the variables used.
- VAR multi-equation model has more explanatory power than single one

Data

- Source: Statistics Year Books published by Vietnam's General Statistics Office (GSO) since 1989
- Time-series annual data from 1986 to 2007, at 1994 constant price.
- Data converted into per cent changes and fitted with three-year lags.

Data (cont)

- Augmented Dickey-Fuller tests used to check the four variables' stationary and non-stationary possibility.

Variable	Data in levels				Data in per cent changes			
	Lags	Trend	t-statistics	p-value	Lags	Trend	t-statistics	p-value
D	0	1	-2.300	0.4351	4	0	-8.984	0.0000
Y	0	0	13.207	1.0000	4	0	-3.648	0.0049
I	0	1	-2.329	0.4192	0	1	-3.562	0.0332
X	1	0	5.908	1.0000	4	0	-7.107	0.000

- Note: D (productivity); Y (GDP); I (investment); X (export)*

Empirical Results and Analysis

- Two hypotheses on export-led growth and investment-led growth respectively investigated to Vietnam's economy through:
 - Granger Causality Wald Tests
 - Variance Decomposition of GDP
 - Impulse Respond Functions

VAR model of export-led growth

Dependent Variables	Excluded variables	P-value
D	Y	NA
D	I	0.000
D	X	0.000
D	ALL	0.000
Y	D	NA
Y	I	0.003
Y	X	0.026
Y	ALL	0.003
I	D	NA
I	Y	0.000
I	X	0.321
I	ALL	0.000
X	D	NA
X	Y	NA
X	I	NA
X	All	NA

Granger Causality Wald Tests:

- *Assumption* : X disturbs all Y, I, D but no interaction from Y, I, D to X => no Granger causality from investment, GDP and productivity to export is examined in this model.
 - Both export and investment Granger causes GDP growth at 5% level.
 - Only GDP Granger causes investment while export does not.
 - Productivity is Granger caused by both investment and export at 1% level but it doesn't Granger cause any other variables.
- => The test shows an evidence that GDP growth may be caused by investment and export but the expectation that productivity may be a factor that transmits their effects on GDP is not verified by the test's results

VAR model of export-led growth

Variable	D	Y	I	X
Period 1	3.0436	96.9564	0	0
Period 2	1.7239	46.1944	50.533	1.5486
Period 3	1.6307	49.0785	47.7508	1.5399
Period 4	7.6396	45.0304	46.2447	1.0853
Period 5	6.7210	39.6087	52.4326	1.2377
Period 6	6.3645	44.3050	48.2036	1.1269
Period 7	6.7254	38.2985	53.9315	1.0446
Period 8	6.4202	38.1989	54.2973	1.0836

Decomposition of Forecast Error Variance of GDP

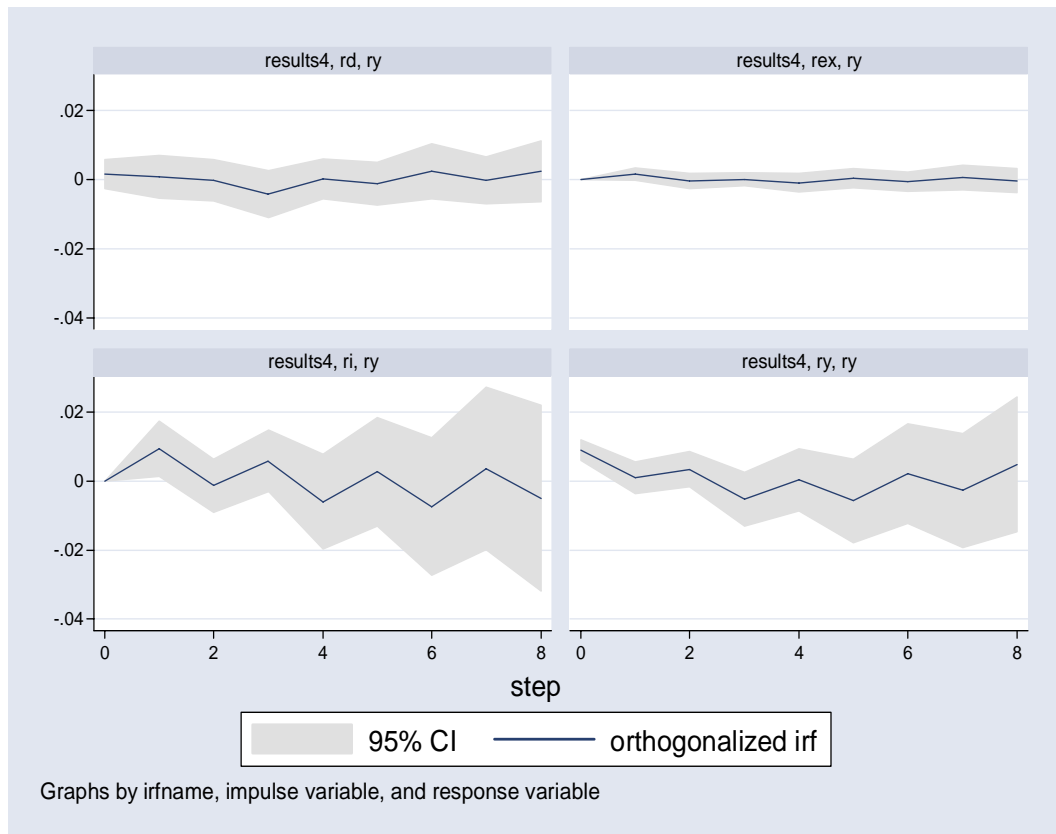
- For most of the periods, investment explains nearly 50% of the GDP variation, while export explains only 2 % approximately.

- Productivity doesn't explain much GDP either.

=> VN's investment seems to be the most important factor that explains the highest percentage of GDP's variation.

=> VN's economic growth could be better predicted by looking at information of investment than looking at information of other factors like export and productivity

VAR model of export-led growth



Note :
results4, rd, ry (Impulse Response of GDP to productivity)
results4, rex, ry (Impulse Response of GDP to export)
results4, ri, ry (Impulse Response of GDP to investment)
results4, ry, ry (Impulse Response of GDP to GDP)

Impulse Response Function of the GDP

- reveal how GDP responds to shocks in investment, export and productivity (restriction placed on export).
- shocks in productivity and export have very small effects on GDP.
- export seems to give very little information to forecast GDP (horizontal line)
 ⇒ Further weaken the export-led growth hypothesis of this model.
- GDP's responses to investment shocks appear to be strongest though not consistent over the period => investment's various effects on GDP during different periods.

VAR model of investment-led growth

Dependent Variables	Excluded variables	P-value
D	Y	NA
D	I	0.493
D	X	NA
D	ALL	0.493
Y	D	0.000
Y	I	0.000
Y	X	NA
Y	ALL	0.000
I	D	NA
I	Y	NA
I	X	NA
I	ALL	NA
X	D	0.000
X	Y	0.000
X	I	0.000
X	All	0.000

Granger Causality Wald Tests:

- *Assumption* : I disturbs all Y, X, D but no interaction from Y, X, D to I => no Granger causality from export, GDP and productivity to investment is examined in this model.
 - Productivity and investment Granger causes GDP growth at 5% level.
 - No evidence of Granger causality from export to GDP but significant evidence of Granger causality from all other variables to export.
 - Productivity is Granger caused by none of the three variables .
- ⇒ results show evidences supporting the investment-led growth hypothesis but no evidence that GDP is affected by investment through productivity.

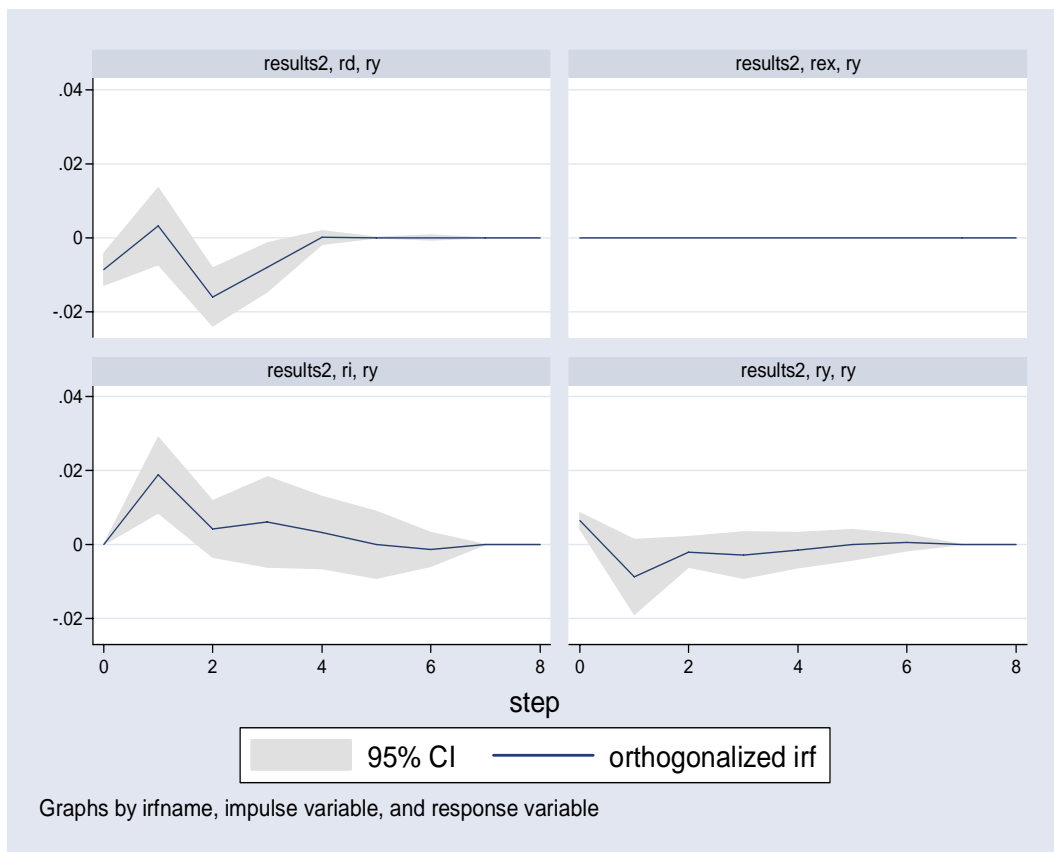
VAR model of investment-led growth

Variable	D	Y	I	X
Period 1	63.6027	36.3973	0	0
Period 2	15.0002	21.1986	63.8012	0
Period 3	40.7819	14.5723	44.6458	0
Period 4	42.8302	13.732	43.4378	0
Period 5	42.246	13.7845	43.9695	0
Period 6	42.246	13.7845	43.9695	0
Period 7	42.151	13.793	44.0559	0
Period 8	42.151	13.793	44.0559	0

Decomposition of Forecast Error Variance of GDP

- Results consistent with those in VAR model of export-led growth.
 - export bears almost no information for the GDP growth.
 - productivity is a quite strong explanatory factor of GDP variation (40 % on average)
 - investment remains the strongest explanatory to explain GDP variations (well about 40%)
- => Information on investment helps forecast GDP much better than that on productivity, export and GDP itself.

VAR model of investment-led growth



Note :
results2, rd, ry (Impulse Response of GDP to productivity)
results2, rex, ry (Impulse Response of GDP to export)
results2, ri, ry (Impulse Response of GDP to investment)
results2, ry, ry (Impulse Response of GDP to GDP)

Impulse Response Function of the GDP

- Same as that of 1st model but run under restriction placed on investment
 - Likewise, GDP seems to have the strongest and most persistent responses to investment shocks (only negative, and null after period 6)
 - Line illustrating GDP's movements against export shocks almost flat for all period (similar to that of 1st model)
- ⇒ Changes in investment gives much more information to predict GDP than those in export.
- GDP's responses to productivity changes: various (maybe because of structural change of economy)

Conclusion

- Empirical results from 2 VAR models seem to strongly support the hypothesis that investment is the main engine pushing Vietnam's economy:
 - it Granger causes GDP at 5% level
 - explains most of GDP variations
 - GDP has strongest responses to investment shocks.
- Results implies that export's impacts on VN's GDP growth appear very small
- Results show productivity is also an important factor determining VN's economic growth but no evidence proving that investment's effects are transmitted to GDP through productivity

Policy Implications

- Conclusions indicated from empirical evidence suggests that Vietnam's economic growth may not be sustainable (investment, rather than export promotes GDP growth but not through investment's or export's improving productivity)
Like: you are rich because you are given much money that isn't used to do things that make more money.
 - VN's investment may have stimulated domestic consumption that has promoted GDP growth.
 - Positive impacts of exports on GDP may have been outpaced by simultaneous booms of imports.
- => Questions should be raised about real effectiveness of investment on the economy in the sense that investment is supposed to create more positive externalities, including productivity improvement, to the economy.**

Thank you for your
attention!