The Global Economy
David Backus

Midterm Examination

Revised: November 3, 2013

You have 90 minutes to complete this exam. Please answer each question in the space provided and show all of your work. You may consult one page of notes and a calculator, but devices capable of wireless transmission are prohibited.

I understand that the honor code applies: I will not lie, cheat, or steal to gain an academic advantage, or tolerate those who do.

____

(Name and Signature)

Year	Y/L	K/L
1990	2.489	2.396
2011	6.582	24.722

Table 1: Aggregate data for Vietnam. Y is real GDP, K is the stock of capital, and L is the number of people working. The numbers are thousands of 2005 US dollars. Source: Penn World Table, Version 8.0.

1. *Prospects for Vietnam (40 points).* You have been asked to provide a short overview of Vietnam's economic prospects for a group of international business leaders who have come to Washington DC for the annual IMF meetings. To many in the United States, Vietnam brings up painful memories of war and Oliver Stone movies, but its economic performance over the past two decades has been extraordinary. GDP per capita remains low at about 3600 USD, but its GDP growth rate since 1990 has been over 7 percent per year.

   In preparing your report, you start with some basic data from the Penn World Table, reported in Table 1. Then you turn to the Economist Intelligence Unit, where you find (quotes from reports, edited lightly for continuity, with additional data from other sources):

   - The Communist Party remains the dominant political force. The government, the army, and the bureaucracy are subordinate to it.
   - Vietnam's economic success over the last two decades followed the Party's 1986 commitment to "economic renovation." By the end of the 1980s economic reforms had become part of the new consensus.

- Regulatory conditions and market access for foreign investors have continued to improve in recent years, reflecting Vietnam's efforts to fulfil its commitments on accession to the World Trade Organisation (WTO) in January 2007.
- The EIU democracy index puts Vietnam among the most authoratarian regimes in the world. In the functioning of government, however, Vietnam fares much better, and the public's confidence in the government and the party is high. Vietnam also scores well in the degree of societal consensus and cohesion. The judiciary is relatively weak and not independent of the Communist Party.
- The World Bank's Doing Business now ranks Vietnam 99th (of 185) on overall ease of doing business, which is below China (91) and above India (132). The World Bank's Governance Indicators rank Vietnam in the 43rd percentile on overall government effectiveness and the 39th percentile on rule of law. The Heritage Foundation rates Vietnam 15 (of 100) on rule of law but 64 on business freedom and 79 on open markets.
- A recent slowdown in growth coincided with growing evidence of corruption and rising prices gas, food, and utilities, which led the prime minster to make a public apology. The trouble stems in large part from the Communist Party's failure to discipline state-owned enterprises, which account for 40% of output, and to clean up bad debts lurking in state-owned banks. Some state-owned firms are reported to be so cash-strapped they have stopped paying workers.
- There has been debate in the party between conservative hard-liners pushing for stability and reformist moderates who would like to see further liberalization, including privatization of state-owned firms. One Western diplomat says the question now isn't whether real reform will happen, but how fast.

(a) Using the data in the table, compute the continuously-compounded annual growth rate of GDP per worker for the period 1990-2011. (5 points)

(b) Identify the sources of growth in Vietnam over the same period. (This is an indication that you should do the usual growth accounting calculations. Be sure to include calculations of productivity.) What is the primary source of growth? (15 points)

(c) Between 1990 and 2011, average years of schooling for adults rose from 5.3 to 6.3. By how much would you estimate this increased GDP? (5 points)

(d) Continued high performance in developing countries is often connected to continued improvement in institutions. Which institutions are important, in general? From what you've read above, how does Vietnam rate on them? Using the information presented, and your own good judgement, how attractive do you think Vietnam will be over the next ten years to international firms looking to do business there? (15 points)

Solution: Brief answers follow, but see also the attached spreadsheet: download this pdf file, open it with the Adobe Reader or the equivalent, and click on the pushpin:

The calculations for (a,b) are summarized here:

Year	Y/L	K/L	A
1990	2.489	2.396	1.860
2011	6.582	24.722	2.259
Growth rate	4.631	11.114	0.926
Contribution to growth	4.631	3.705	0.926

The row labeled "contribution" is the same as the previous one, except that the growth rate of capital per worker has been multiplied by $\alpha = 1/3$.

(a) The continuously-compounded annual rate of growth is

$$\gamma_{Y/L} \;=\; [\ln(6.582) - \ln(2.489)]/(2011 - 1990) \;=\; 4.631\%.$$

Grading: 5 points for correct calculation.

(b) Growth accounting involves this equation:

$$\gamma_{Y/L} \;=\; (1/3)\gamma_{K/L} + \gamma_A.$$

With the numbers above, we have (in percentages)

$$4.631 \;=\; (1/3)11.114 + 0.926 \;=\; 3.705 + 0.926.$$

We see, unusually, that most of the growth here has come from an enormous increase in the capital stock. The contribution of productivity, which is usually the most important one, is relatively small.

Looking to later questions, this could be a source of concern: that we're not seeing the increase in productivity we'd expect to see.

Grading: 3 points for noting the growth accounting equation, 3 for the productivity numbers, 3 for the growth rates of capital per worker and productivity, 3 for multiplying the former by one-third, and 3 more for interpreting the results sensibly.

(c) This is a more difficult question, designed for the aficionados. At an intuitive level, you might guess that increasing the skill of the labor force would raise output. More formally, you might use a version of the production function that includes "human capital" H, the term we use for skill:

$$Y = AK^{\alpha}(HL)^{1-\alpha}.$$

You could go further and describe the connection between skill and education, as we do in the text, but that's not necessary here.

Grading: 2 points for noticing that this would raise the skill level of workers, and therefore raise output. 3 points for a more formal analysis like the one above.

(d) The standard list of institutions is governance, property rights, rule of law, and open competitive markets. Possible comments include:

- Governance. The view expressed by Madison is that the government has to be strong enough to control misbehavior by the governed, but not so strong to encourage misbehavior by itself. A one-party system provokes some concern about the latter, but the public's high degree of confidence in the government suggests it has been responsive to their concerns. The apology for corruption etc is an example. Ditto the mention of business freedom.
- Property rights are an issue. Vietnam ranks poorly here, a common byproduct of a communist past.
- Rule of law is a similar source of concern. Note, for example, the absence of an independent judiciary. Despite this, Heritage ranks it highly on business freedom.
- Open competitive markets. Heritage ranks it highly on open markets. The major concern here is with the state-owned firms, which are likely to have superior access to funding and perhaps monopoly positions in things like utilities. The optimistic scenario expressed by the unnamed diplomat is that reforms will make even these markets more competitive in the future.

Grading: 5 points for the list of institutions, 10 for some sensible assessment of them.

2. *Zambeef looks for opportunities (20 points).* Zambeef, the Zambia-based meat distributor, is looking for new opportunities. The Economist reports: "Zambeef operates meat counters at all 20 Shoprite stores across Zambia as well as its newer outlets in Ghana and Nigeria. Zambeef also has around 100 shops of its own. The CEO notes that with markets targeting both low and high-income consumers, they are able to sell 'all of the animal.' The firm is also vertically integrated; its 'farm-to-fork' model includes farms, retail outlets, and 'cold chain

Indicator	Zambia	Botswana	Tanzania
General			
GDP per capita (2005 USD)	1690	11,300	1250
Population (millions)	13.5	2.0	44.9
Doing Business overall (percentile)	49	68	27
World Economic Forum overall (percentile)	37	50	16
Governance			
Political stability (percentile)	66	88	48
Govt effectiveness (percentile)	38	68	28
Regulatory quality (percentile)	37	74	37
Rule of law (percentile)	42	75	34
Control of corruption (percentile)	46	79	22
Labor			
Minimum wage (USD per month)	76	92	52
Severance after 10 years (weeks of pay)	87	36	10
Labor market efficiency (percentile)	37	68	67
Literacy (percent of adults)	71	84	73
Years of school (adults)	6.7	9.6	5.8
Infrastructure and trade			
Infrastructure quality (percentile)	20	36	10
Import documents required (number)	8	5	6
Import delay (days)	56	37	31
Import cost (USD per container)	3600	3500	1600

Table 2: Economic and institutional indicators. Percentiles range from 0 (worst) to 100 (best). Sources: Penn World Table, World Economic Forum, World Bank, Doing Business.

logistics' with its fleet of 78 refrigerated trucks. The downside of recent expansion, they say, is the demands on its managers."

Zambeef is now looking to expand, either in Zambia or in nearby countries. As a consultant based in Johannesburg, you have been asked to advise Zambeef on the strengths and weaknesses of neighboring Botswana, Tanzania, and Zambia. You quickly summarize various measures of institutional quality in the three countries; see Table 2. You also turn to the World Economic Forum's Global Competitiveness Report, which includes a survey of business leaders and tabulates the most commonly reported problems. For the three countries, the most common complaints were

- Zambia: access to financing, corruption, and inadequate infrastructure.
- Botswana: poor work ethic of labor force, inefficient government bureaucracy, and access to financing.

- Tanzania: access to financing, corruption, and inadequate infrastructure.

(a) Describe the features of an economy that are important to operating a business like Zambeef's. How do Botswana and Tanzania compare to Zambia on these features? (10 points)

(b) What issues raise the most concern in each country? How might you deal with them? What location(s) would you recommend? (10 points)

Solution: This is a more qualitative question, and a somewhat fuzzy one at that, but here are some of the things a good answer might mention. A good answer should put some structure on the analysis, not simply list what's in the table.

(a) Zambeef is deeply imbedded in any country in which it operates. Unlike, say, manufacturing for export or business-process outsourcing, they have to deal with the full range of political and economic conditions. Moreover, food is typically a regulated business, so they'll have to deal with that. As a rough guide:

- Market size. Tanzania has the largest population by a wide margin. Zambia is next. Botswana is smaller, but has much higher income per person.
- Overall business conditions. Both DB and the WEF rate the countries in this order: Botswana > Zambia > Tanzania. The same for political stability, government effectiveness, rule of law, and control of corruption. That falls roughly in line with GDP per capita. All of these things are important to us. If, say, meat inspectors are corrupt, that's a problem for the business — or at least an extra cost.
- Labor market. We have limited data here, but obviously we need to hire people. The worst labor market seems to be Zambia, where the business seems to operate fine, so the other countries must be doable. The minimum wages seem manageable. It's not clear how important literacy is, but there's not a huge difference across countries. One concern is the comment about the poor work ethic in Botswana.
- Infrastructure. Botswana is again the strongest of the three and Tanzania the weakest. Yet you wonder, given that the business works in Zambia, whether this is something that can be overcome.
- Trade restrictions. These seem to be roughly similar, with Zambia the worst. Curiously, this data suggests it's cheaper to import into Tanzania than other countries. You might want to check with Zambeef and see whether that's relevant.

Grading: 10 points for a clear list of issues and a logical argument that connects the institutions to the demands of the business. Partial credit for part thereof.

(b) If this were real life, we'd have a series of questions we'd want to address with more information. Among them:

- Zambia: Are there more opportunities? Or is "all 20" at Shoprite the limit? Are the "demands on managers" simply a sign of growth, or does it reflect something about the supply of the right kind of talent?
- Botswana: How concerned should we be about the work ethic? Does the higher income suggest a different market segment than we're used to?
- Tanzania: Is the poor infrastructure manageable? Should we be concerned about government effectiveness and corruption?

All three countries look doable given these numbers, and the fact that this business works in Zambia. Two other things we'd want to look at are the existing competition in each location and whether Shoprite or another partner might facilitate entry.

Grading: 10 points for a logical argument that flows from your earlier analysis and identifies the key issues.

3. *Short questions (50 points).*

(a) In 1960, 41% of women aged 25-54 in the US were employed. In the most recent data, the number is 69%. What is the likely impact on US GDP growth over this period? What is the likely impact on the US employment rate? (10 points)

(b) Suppose Apple's Irish assembly plant took 230 (millions of euros) in parts produced in Asia and hired workers for 80 to assemble products worth 320, which were then sold in the US. What is the value-added of the plant? Which of these transactions appears as an expenditure in the Irish national accounts? (10 points)

(c) Describe, in Ricardo's model, how — and why — free trade affects productivity. (10 points)

(d) Consider the statement: "When financial institutions fail, we should let them fail." Do you agree or disagree? Why? (10 points)

(e) Consider the statement: "Germany's high investment rate is supported, in large part, by flows of capital from other countries." Do you agree or disagree? Why? (10 points)

Solution:

(a) An increase in women working should lead to (i) more output (via the production function) and (ii) an increase in the employment rate (the ratio of the number of people employed to the adult population).

Grading: 5 points for noting the increase in output, including mention of the production function; 5 points for noting the increase in the employment rate, including a statement of what that is.

(b) Value-added is $320 - 230 = 90$. Expenditure components are imports (230) and exports (320).

Grading: 5 points for value added, 5 for imports and exports.

(c) Free trade changes which good are produced: we shift people to the most productive sector, which raises overall productivity.

Grading: 10 points for this or the equivalent.

(d) We have two opposing objectives: (i) create a good set of incentives for financial institutions (ie, let bad ones fail) and (ii) protect the rest of the economy from the collateral damage a failing financial system would do to them (ie, prop up financial institutions in times of trouble). Most financial regulation is an attempt to balance these two things.

Grading: 5 points each for noting (i) and (ii), or the equivalent.

(e) Disagree — it's opposite. We saw that Germany's saving rate is greater than its investment rate, so capital flows out of Germany to other countries, not from them.

Grading: 10 points for this.