Midterm Examination

Revised: March 26, 2012

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)

1. *Indonesia.* Indonesia is one of the world's most populous countries, but it remains a poor one, with GDP per capita of about 6 thousand US dollars. Its recent trajectory, however, has been strong, with average GDP growth over 5% between 2000 and 2011 and a barely perceptible impact from the global financial crisis.

   From EIU reports, we find that Indonesia's recent success comes after a tumultuous history. Following independence from the Dutch after World War II, it had several decades of authoritarian rule. The bloody transition from Sukarno to Suharto in 1965 is vividly portrayed in Peter Weir's 1982 film, "The Year of Living Dangerously." Economic performance improved under Suharto, but dissatisfaction with authoritarian rule peaked after the Asian Crisis of 1997, when the currency fell by 80% against the dollar and real GDP fell 14%.

   After the crisis, Indonesia made a rapid transition to multi-party democracy, with the first democratic elections in 34 years in 1999 and several more since then.

   Your mission is to examine the economic roots of recent success using the data in Table 1.

   (a) What is the average annual growth rate of GDP per capita between 2000 and 2011? GDP per worker? (Here and elsewhere in this question, growth rates are understood to be continuously-compounded.) (10 points)

   (b) What was total factor productivity in 2000 and 2011? Its average annual growth rate? (10 points)

   (c) What are the other sources of growth? What factors account for the growth rate of GDP per worker you computed in (a)? GDP per capita? (10 points)

Year	POP	Y/POP	Y/L	K/L
2000	220.0	4,151	8,828	21,408
2011	245.6	6,209	12,672	23,471

Table 1: Indonesia: aggregate data on output and inputs. Population is in millions. The other numbers are 2005 US dollars (PPP adjusted, from Penn World Tables and EIU CountryData).

Solution: Short answers follow, see the accompanying spreadsheet for specific calculations.

(a) The growth rate of GDP per capita is

$$\gamma = \log(6.209/4.151)/(2011 - 2000) = 3.660\%.$$

As always, log means the natural logarithm, sometimes denoted LN. I moved the decimal point for convenience, but it has no affect on the growth rate. Using the same method, the growth rate of GDP per worker is 3.286%.

Grading: 5 points for correctly computing each number.

(b) Productivity we find indirectly from $A = (Y/L)/(K/L)^\alpha$. In 2000, we find

$$A = (Y/L)/(K/L)^{1/3} = 8.828/21.408^{1/3} = 3.179.$$

If you don't move the decimal point, your numbers will be multiplied by 100. In 2011, the same calculation gives us $A = 4.426$. The growth rate is 3.007%.

Grading: 4 points for each TFP number, 2 for its growth rate.

(c) Growth in GDP per worker has these components:

$$\gamma_{Y/L} = \gamma_A + \alpha\gamma_{K/L}$$
$$3.286 = 3.007 + 0.279.$$

Similarly, growth in GDP per capita is

$$\gamma_{Y/POP} = \gamma_{L/POP} + \gamma_A + \alpha\gamma_{K/L}$$
$$3.660 = 0.374 + 3.007 + 0.279.$$

It's evident in both cases that productivity is the primary force behind economic growth. The bigger question, of course, is where the productivity came from. That wasn't part, but it's not hard to imagine some improvement in institutions. Some of that is evident in the next question.

> Grading: 6 points for growth in GDP per worker and its components, 4
> for the same with GDP per capita.

2. *Indonesia and Kazakhstan.* As the junior member of a consulting team, you
have been asked to collect information on the pros and cons of building a small
manufacturing operation in Indonesia or Kazakhstan. The plant would produce
toys aimed at the growing Asian market. Both countries have shown recent
signs of economic progress. Both are actively recruiting foreign manufacturers,
Indonesia to continue its growth, Kazakhstan to diversify beyond its resource-
based economy.

A collection of institutional indicators is given in Table 2. In addition, the political
situations are quite different. Indonesia is an emerging democracy. The EIU
describes Kazakhstan's political structure as authoritarian:

> Nursultan Nazarbayev, the current president and formerly the first sec-
> retary of the Communist Party of the Kazakh Soviet Socialist Republic,
> has ruled Kazakhstan since independence. He has steadily increased his
> control over Kazakhstan's political structures, which has allowed him
> to secure re-election several times, the most recent presidential elec-
> tion being in December 2005. Parliament approved amendments that
> pave the way for him to remain president for life. His party, Nur Otan
> (Light-Fatherland), won every seat available for election in the new
> parliament.

As a result, the political situation is thought to be stable.

(a) Which of these indicators are most important to your venture? How do the
two countries compare on them? (10 points)

(b) Which country or countries would you recommend to your clients? What
are the challenges they would face? (10 points)

Solution:

(a) All of these matter somewhat. I'd say labor is important in a manufac-
turing operation, and also infrastructure and trade, because you plan to
export your product. And political stability is important because you
want to know the climate won't quickly change for the worse.

Grading: 10 points for a clear logical argument that connects the insti-
tutions to the demands of the business, either this one or something else.
Partial credit for part thereof.

Indicator	Indonesia 1996	Indonesia 2010	Kazakhstan 1996	Kazakhstan 2010
Governance				
Political stability (percentile)	13.5	18.9	28.4	61.8
Govt effectiveness (percentile)	40.0	47.8	13.2	44.5
Control of corruption (percentile)	30.7	27.3	9.3	15.3
Labor				
Minimum wage (ratio to average)		0.41		0.13
Severance after 10 years (weeks of pay)		56		4
Mandatory vacation (days per year)		0		13
Flexible hours? (yes, no)		yes		yes
Transportation infrastructure				
Overall quality (percentile)		42		40
International trade				
Documents required (number)		4		9
Delay (days)		17		76
Cost (USD per container)		644		3130

Table 2: Institutional indicators for Indonesia and Kazakhstan.

(b) One thing you might do is rate the two countries along all of these dimensions, then come up with an overall grade based on your weighting of their importance. A quick summary might be:

- Governance. Both look ok. The numbers aren't great, but that's the challenge of operating in an emerging market. (The benefit, of course, is low price.) Curiously, Kazakhstan gets a better grade on political stability. It's a bit worse, though, on corruption.

- Labor. Both countries have reasonably flexible labor markets, although severance is higher in Indonesia.

- Infrastructure and trade. The big issue here is the delay in exporting (76 days!) and cost of shipping a container — both worse for Kazakhstan.

You could go either way, but I lean toward Indonesia, which has become something of a darling among emerging markets.

The World Economic Forum says: "Indonesia remains one of the best-performing countries within the developing Asia region. Sound fiscal management has brought the budget deficit and public debt down to very low levels, attributes that contribute to further upgrading the countrys

> credit rating. The situation is also improving, albeit from a much lower base, in the area of physical infrastructure." They also note that "the quality of port facilities remains alarming" and "the electricity supply continues to be unreliable and scarce." As usual, some good, some bad. They rate Indonesia 46th (of 142 countries), Kazakhstan 76th. They're using information that goes beyond the question, but I include it for background.
>
> Grading: 10 points for a clear logical argument, either this one or something else, partial credit for part thereof.

3. *True/false.* Please explain why each statement is true, false, or uncertain. The explanation is essential.

    (a) If a product is made in the Mexico but sold to consumers in the US, it is not included in Mexican GDP. (10 points)

    (b) If the unemployment rate falls, employment has risen. (10 points)

    (c) Firms find it costly to search for workers with the right skills. For that reason, regulations that discourage labor turnover are good for the economy. (10 points)

    (d) A tax on labor tends to reduce employment. (10 points)

    (e) In Ricardo's model, free trade is good for consumers but bad for workers. (10 points)

Solution:

(a) False. GDP measures production in a country. It doesn't matter who buys it.

(b) Uncertain. The issue here is that there are three categories: employed, unemployed, and not in the labor force. A lot of the action is in the last category. So if some of the unemployed get jobs, that lowers the unemployment rate and raises employment and the statement is true. But if some of the unemployed leave the labor force, we could see employment flat and the statement is false. Or employment could fall, too, if the workers leave the labor force without ever being unemployed. In short, employment and unemployment can (and do) point in different directions.

(c) False. Since the cost is borne by firms, they're in the best position to act accordingly. But reducing turnover by regulation will force firms to

---

retain workers even when that cost is outweighed by the benefits of a flexible workforce.

Think of the example of Spain where high severance and related requirements discourages firms from hiring during expansions. This leads to a lower level of employment on average. It also leads to greater use of temporary workers who are not subject to this requirement but must leave their jobs when their contracts expire. In this case, raising the cost of firing workers actually increases turnover.

(d) True. Think of a supply/demand setup. Consider a tax on labor paid by firms (that's not essential, but it's helpful to be precise). That will shift the demand curve down by the amount of the tax. If demand slopes down and supply slopes up, we'll see a decline in employment. This isn't all that different from other products: we tax cigarettes, for example, because we want to reduce the quantity. This is the same logic.

(e) False. It's good for everyone. More to the point: workers and consumers are the same people, both in Ricardo's model and the real world.

Grading: 10 points for something like the answers above.