

# Principles of Economics I: Microeconomics – Midterm [2018/11/9]

Note: You have 170 minutes (10:20am-1:10pm), and there are 100 points. Allocate your time wisely.

## Part A (26%): “Venezuela raises minimum wage 3,000% and lots of workers get fired,” Bloomberg (2018/09/14)<sup>1</sup>

Venezuelan workers who earned a pittance are now earning a slightly larger pittance, thanks to a big increase in the minimum wage. What they may not have are jobs. Starting this week, 7 million employees are guaranteed 1,800 bolivars a month -- worth about \$20 at the black-market rate. President Nicolas Maduro intended the mandate as political boost, but it's having the opposite effect as companies, already hit by Venezuela's epic economic contraction, tell workers they can't afford to keep them. While there have been many similar moves in the past, never has one been so disruptive, arriving amid hyperinflation, depression and devaluation. Some employers are restructuring costs, rejiggering pay scales and negotiating settlements with workers. Others are simply dismissing people... (omitted)... In two industrial and wholesale districts in Caracas, La Trinidad and Boleita, about half the businesses were closed last week, including several restaurants that depend on local workers. Weekday traffic resembled the leisurely flow of a Sunday. “I have four salesmen; all have come in this morning,” said Manuel Rosas, 55, who owns a shop that sells spare parts for Chryslers. By 11 a.m., he had sent them all home because they had nothing to do...

### Answer the following questions:

1. (5%) Is the price control of raising minimum wage by 3000% binding or non-binding? Is it causing shortage or surplus? Draw a supply and demand diagram to analyze how price control affects market price and quantity.
2. (4%) What is Venezuela's new minimum wage in US\$ (at the black-market rate)? What was the original minimum wage rate in US\$? Use the midpoint method to calculate the percentage change in wage rate.
3. (5%) Use the midpoint method to find the percentage change in labor employment by assuming the amount of workers who have been working in businesses that shutdown are the same as the amount of workers working in businesses that did not shutdown. Use your answer to calculate the price elasticity of labor demand. Is labor demand elastic or inelastic?
4. (4%) What assumptions are required to calculate the above price elasticity of demand? Are they realistic? How would your elasticity estimates be biased if they do not hold?
5. (5%) How does price control affect consumer surplus, producer surplus and total surplus? Draw a supply and demand diagram to illustrate. Is this policy good for economic efficiency? Explain.
6. (3%) What would happen if the Venezuela government imposes even more price (or even quantity) control in response to this trend of shut-down? Explain.

## Part B (26%): “Chinese economy slowing faster than expected, worst yet to come,” 南華早報 (2018/10/31)<sup>2</sup>

China's economy appears to be slowing faster than expected at the start of the fourth quarter, a bad omen for growth early next year when the full force of the trade war with the United States comes to bear... (omitted)... Business sentiment in both the manufacturing and non-manufacturing sectors was weaker than expected in October, led by sharp declines in export demand, according to the official purchasing managers' index published

<sup>1</sup> Excerpts from <https://www.bloomberg.com/news/articles/2018-09-14/after-getting-3-000-wage-hike-workers-are-fired-in-venezuela>

<sup>2</sup> Excerpts of <https://www.scmp.com/news/article/2170966/chinese-manufacturing-activity-slows-more-expected-trade-war-intensifies>

on Wednesday by the National Bureau of Statistics and the China Federation of Logistics and Purchasing. The figures were the first gauges of the trade war's impact since the US levied 10 per cent tariffs on US\$200 billion worth of Chinese goods in late September... (omitted)... That situation could worsen in January, when the tariff on the US\$200 billion of Chinese imports is set to rise to 25 per cent. It might also be exacerbated by the "front loading" behaviour of many Chinese exporters – boosting production and shipments now to fill orders for early next year before the scheduled tariff rate increase... (omitted)... **In retaliation, China might implement qualitative measures, such as more aggressive inspections of imports from the US, creating stiffer visa requirements for visiting American workers, slowing regulatory approval for US companies operating in China, or targeting service imports from the US, including restricting the enrolment of Chinese students at American universities.**

**Excerpts from "Argentina says exports soyoil to China for first time in 3 years" (Reuters, 2018/8/28)<sup>3</sup>**

Argentina is exporting soyoil to China for the first time in three years, the agriculture ministry said in a statement on Tuesday. A 29,000-tonne shipment of soyoil was being loaded at the port of Timbues, near Argentina's Rosario grains hub, the statement said. Two more shipments of soyoil were also planned for China, it said, for a projected total 90,000 tonnes... (omitted)... China usually imports soybeans to be crushed locally into soyoil and soymeal livestock feed. But China is struggling to stock up on beans due to a trade dispute with the United States. Soyoil and soymeal crushers in Argentina have had to import raw beans from Brazil, Paraguay and the United States this year due to a drought in the Pampas farm belt that hurt the harvest.

The planned shipments to China come despite a move by the Argentine government on Aug. 14 to suspend for six months its program of gradually cutting taxes on exports of soymeal and soyoil. International shipments of both soy products are currently taxed at 23 percent. The head of Argentine soyoil industry group CIARA had warned that the suspension of tax cuts would cause a drop in exports. The last time Argentina exported soyoil to China was 2015, when the South American grains powerhouse sent 538,300 tonnes, at the time worth \$364 million, according to Argentine government data.

**Answer the following questions:**

1. (8%) What is the effect for US to impose a 10% tariff on Chinese goods, when China is the major supplier in the world market for these products? Draw a supply and demand diagram **illustrating the US market (one of) of these products** to analyze the effect on equilibrium price and quantity, consumer surplus, producer surplus, government tax revenue, and total surplus. Who is better off in the US economy? Who is worse off?
2. (4%) Why is China now importing soyoil from Argentina, which imports raw beans from the US (instead of importing directly from the US)? What is the effect for China to retaliate by levying 10% tariff on US goods, when US is only one of the many suppliers for agricultural products?
3. (8%) What is the effect of Argentina's tax cut on exports of soymeal and soyoil? Draw a supply and demand diagram for the Argentina soyoil market to analyze the effect on equilibrium price and quantity, consumer surplus, producer surplus, government tax revenue, and total surplus.
4. (4%) Who is better off after the tax cut in the Argentina economy? Who is worse off? Is China better off or worse off due to the tax cut? Explain.
5. (2%) Do you think Argentina should carry out the tax cuts despite exports to China? Why or why not?

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<sup>3</sup> URL: <https://www.agriculture.com/markets/newswire/argentina-says-exports-soyoil-to-china-for-first-time-in-3-years>

**Part C (29%): Excerpts of “EU to offer billions of funding for electric battery plants,” Financial Times (2018/10/14)<sup>4</sup>**

The EU is planning to allow state aid for electric battery research and will offer billions of euros of co-funding to companies willing to build giant battery factories. Brussels is concerned that the EU auto industry, which employs 13m people, could be left behind in the race to build mass market electric vehicles because of their reliance on batteries from Asia... (omitted)... “We know very clearly that the future is electric and we simply have to catch up with this (battery) technology,” said Maros Sefcovic, energy vice-president at the European Commission. “You cannot develop new models or high-quality cars if you do not master the skills, the innovation, and research link with batteries.” Roughly 80 percent of the world’s existing and planned battery production capacity is in Asia, according to Bloomberg data. China alone has 69 percent, with the US at 15 percent and the EU at under 4 percent.

A battery project launched by the EU a year ago now offers five types of funding. Individual EU countries will be allowed to fund 100 percent of research, as long as they involve some cross-border projects. The EU’s Horizon 2020 research fund has set aside €200m for battery projects; €800m is available to finance building demonstration facilities... (omitted)

**Answer the following questions:**

1. (9%) First assume a local battery industry indeed creates positive externalities to the EU economy (as stated above). Draw a supply and demand diagram for the market of electric batteries to analyze equilibrium price and quantity, as well as welfare evaluated by comparing social cost, social benefits to consumer surplus, producer surplus, and total surplus.
2. (8%) What is the effect of EU subsidizing local battery innovation? Draw a supply and demand diagram to analyze the effect on equilibrium price and quantity, consumer surplus, producer surplus, government tax revenue, and total surplus.
3. (5%) How would your above answers change if a local battery industry actually creates no externalities?
4. (2%) Do you think a local battery industry actually creates positive externality as the article claims? Explain.
5. (5%) Name three other solutions for positive externalities, market-based or otherwise. Are there “better” solutions than subsidies? Explain.

**Part D: (19%) “Canada passed a carbon tax that will give most Canadians more money,” Guardian (2018/10/26)<sup>5</sup>**

Last week, Prime Minister Justin Trudeau announced that under the Greenhouse Gas Pollution Pricing Act, Canada will implement a revenue-neutral carbon tax starting in 2019, fulfilling a campaign pledge he made in 2015.

The federal carbon pollution price will start low at \$20 per ton in 2019, rising at \$10 per ton per year until reaching \$50 per ton in 2022. The carbon tax will stay at that level unless the legislation is revisited and revised.

This is a somewhat modest carbon tax – after all, the social cost of carbon is many times higher – but it’s a higher carbon price than has been implemented in most countries. Moreover, a carbon tax doesn’t necessarily have to reflect the social cost of carbon. The question is whether it will be sufficiently high to meet the country’s climate targets... (omitted)... Provinces whose carbon prices meet the federal standards are already in compliance, so the new law won’t apply to them. Several other provinces (Northwest Territories, Nova Scotia, Prince Edward Island,

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<sup>4</sup> Article URL: <https://www.ft.com/content/097ff758-cec3-11e8-a9f2-7574db66bcd5>

<sup>5</sup> Excerpts from <https://www.theguardian.com/environment/climate-consensus-97-per-cent/2018/oct/26/canada-passed-a-carbon-tax-that-will-give-most-canadians-more-money>

Newfoundland and Labrador) have planned or proposed carbon pricing systems that will meet the federal requirements. The federal carbon tax will be applied to the remaining provinces.

A \$20/ton carbon tax translates into a 16.6 cent per gallon surcharge on gasoline. So, in 2022, the \$50/ton carbon tax will increase Canadian gasoline prices by about 42 cents per gallon (11 cents per liter). For comparison, the average price of gasoline in Canada is \$1.43 per liter, so that would be about an 8% gasoline price increase in 2022... (omitted)... One key component of the federal carbon tax is that it's revenue-neutral, similar to the policy proposal from Citizens' Climate Lobby. All the taxed money will be distributed back to the provinces from which they were generated. The provinces will in turn rebate about 90% the revenues back to individual taxpayers. The rebates are anticipated to exceed the increased energy costs for about 70% of Canadian households.

For example, a Manitoba family will receive a \$336 rebate in 2019 compared to its increased costs of \$232. A similar family in Saskatchewan will receive \$598 compared to its higher costs of \$403. In Ontario, families will receive \$300 to offset its \$244 in carbon taxes. And in New Brunswick a \$248 rebate more than offsets the average household cost of \$202. The rebates will more than double by 2022 as the carbon tax rises, and the net financial benefit to households will grow over time.

**"Sask. environment minister says Ottawa's carbon tax change mirrors province's approach," CBC (2018/8/1)<sup>6</sup>**

Saskatchewan's environment minister says Ottawa is moving more in the province's direction by deciding to lower the percentage of emissions some heavy emitters will have to pay a carbon tax on... (omitted)... Duncan and Premier Scott Moe both expressed a desire for Ottawa to back off from imposing a carbon tax altogether and said Wednesday's news confirmed their concerns a carbon tax could hurt industry competitiveness. "This is a flawed policy. This carbon tax policy does not have any substantial environmental outcomes, but it does have severe impacts to our economy," Moe said. "You're seeing the federal government starting to admit that truly is the case."

Climate change policy expert and University of Regina professor Brett Dolter called Ottawa's move wise. He explained some energy intensive industries are made more vulnerable due to trade, including steel, cement and petroleum. "We have a situation where, to the south, the U.S is not taking a lot of action at the federal level to reduce greenhouse gas emissions and instead are actually trying to fight a trade war with Canada," Dolter explained. "In a world where we had both Canada and the U.S. with a carbon price these measures wouldn't have to be taken, likely. The things that the federal government is doing are trying to protect Canadian industry from the desire from the possibility of leaving to a place where they don't have to pay for pollution."

**Answer the following questions:**

1. (5%) How much carbon dioxide does one liter of gasoline emits judging from the \$0.11/l tax? According to the article, how big is the social cost of carbon? Is this corrective tax sufficient to restore social optimal?
2. (6%) What is the range of possible prices consumers have to pay after this carbon tax is fully implemented? What is the range of possible amounts producers receive? How is the incident of carbon tax determined?
3. (3%) Why does Scott Moe claim that carbon tax is an inefficient policy? Do you think his idea is valid? Explain.
4. (2%) What is the goal for carrying out a rebating policy? Why are taxes refunded to households in particular?
5. (3%) What's the difference between setting up a carbon tax and setting command and control regulations to reduce pollution? Explain.

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<sup>6</sup> Excerpts from CBC News <https://www.cbc.ca/news/canada/saskatchewan/saskatchewan-environment-carbon-tax-1.4770732>