MAE101 Economic Principles, T2, 2017

Individual Written Assignment

Due date Monday 4th September 2017

This assignment is worth 25% of your final mark for MAE101. There is a 2,000 word limit.

Please read the following instructions carefully:
An electronic copy must be submitted to the unit website by **11:59 pm Monday 4th September 2017**.[1] You are strongly encouraged to submit before then to ensure that it is submitted on time. Assignments submitted after the due date without an approved extension will incur a penalty as follows:

- 5% will be deducted from available marks for each day up to five days (that is, you will lose 1.25 marks for each 24 hour period after the due date, up to five days); and
- where work is submitted more than five days after the due date, the assignment will not be marked and 0% be awarded.

Digital literacy is one of the Deakin's Graduate Learning outcomes and among the Unit Learning Outcomes of MAE101. It requires students to be capable of using modern technologies to find, use, and disseminate information. To achieve this goal, it is required that *all* contents of your assignment should be digitally produced, including explanations, diagrams, etc.

To receive full marks you must show clear development and expression of economic ideas in clear paragraphs in addition to the correct answers. Please use concise, properly constructed sentences and paragraphs. Please also use 12pt sized font. You must cite all ideas that are not your own. Do not just quote chunks of text – you must express your answer in your own words.

You may study with other students, discuss the assignment with whomever you wish and even outline answers with others. However, you must write this assignment on your own. Software will check each assignment for plagiarism and collusion. We realize that some sentences will occur in different students' work because there are few ways to say them, e.g., "Price decreased from P1 to P2." However there should be few such matches between any two assignments. Even the process of resolving the case of accidentally matching someone else's work can be time-consuming and upsetting for students.

[1] All assignments are to be submitted *online* in the assignment drop box in CloudDeakin.

Plagiarism and collusion constitute extremely serious academic misconduct. They are forms of cheating, and severe penalties are associated with them. So, please do your own work. It is also very good preparation for the exam.

By clicking the **SUBMIT** button to submit your assignment to the unit assignment drop box, you are declaring that the assignment work is entirely your own except where material quoted or paraphrased is acknowledged in the text. You are also declaring that it has not been submitted for assessment in any other unit or course. For more information about plagiarism and collusion, please go to the Study Support website: http://www.deakin.edu.au/current-students/study-support/study-skills/handouts/refer-plag.php

You must draw all diagrams by software. Please keep in mind that your future employers will expect you to be proficient with computers and that hand-drawn diagrams are usually unacceptable in professional business documents. A short video clip on how to draw graphs by computer in MSWord is available under the *Assessment Resources, Assignment 1* folder in CloudDeakin.

In some MSWord document submissions, graphs and other parts of the assignment may disappear and hence receive no grade. Hence, we prefer that you convert the assignment to PDF.

Requirements:

- Read through your work prior to submission, checking your spelling and grammar.
- No more than 2,000 words in total excluding the task statements, tables, diagrams, and references. It is preferable if you do *not* include the actual task statements; just include the task number.
- All content is electronically generated.
- Convert your assignment to PDF format and check that all text, graphs, tables and formatting are accurate.
- Make sure that you are using correct referencing.

There are 80 marks total for Assignment 1. This will be converted to 25% of your final assessment.

ABOLITION OF MAHOGANY HARVESTING, INCENTIVES, AND HOMICIDE

Background

An important area of economics is the analysis of conflict. While many social and political factors drive conflict, we here focus on economic causes. The aim of this task is to explore the links between economic activity and violence. We will use as a case study the harvesting of big leaf mahogany from Brazilian forests. Big leaf mahogany is one of the most beautiful and valuable woods in the world.[2] Brazil has been the main producer of big leaf mahogany timber. Concerns with excessive destruction of the Amazon and decline in the number of mahogany trees led to the eventual abolition of harvesting of big leaf mahogany in 2001. In this case study we will investigate whether making the harvesting of mahogany illegal had the unintended consequence of increasing homicide. When markets are legal, disputes can be settled through the justice system. However, when an activity becomes illegal, the justice system is no longer available and disputes are often resolved through direct violence.

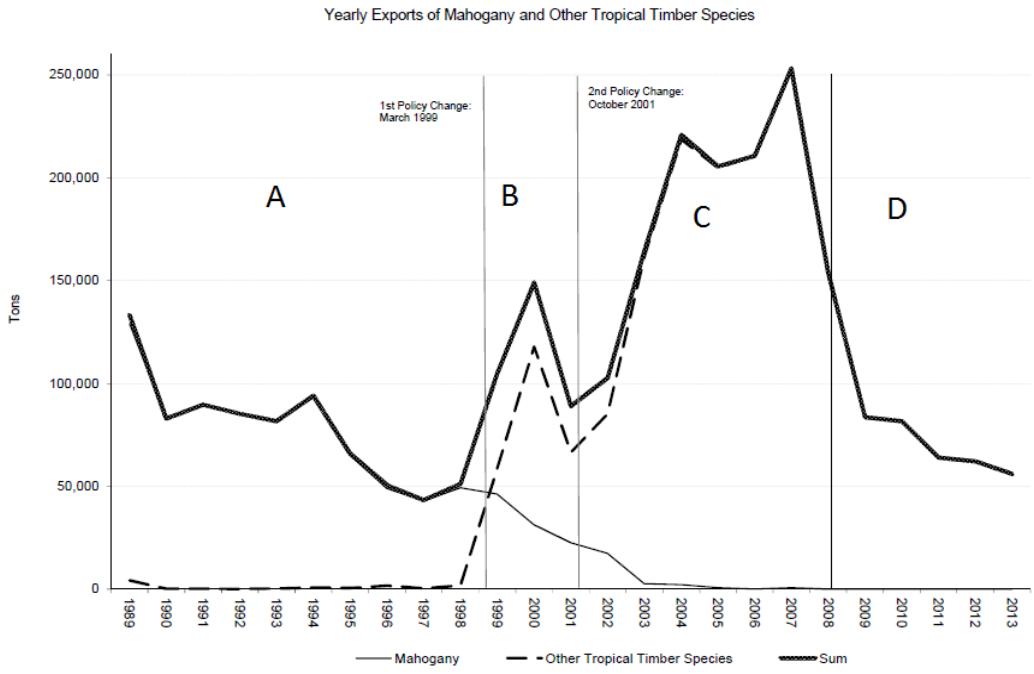
Figure 1: Brazilian big leaf mahogany forest

Figure 2: Harvesting Brazilian mahogany

[2] International trade of mahogany timber can be traced back to around 1700.

Figure 3 illustrates patterns in Brazilian mahogany exports and other tropical timber species during four time periods: (A) before government policy towards harvesting changed significantly; (B) the period between 1999 and 2001 when 85% of licenses to harvest were revoked; (C) the period 2001 to 2008 when harvesting was banned but the government did not actively enforce the ban; and (D) the post-2008 period when greater penalties and enforcement were implemented. The graph illustrates that these government interventions reduced *reported* mahogany exports. However, at the same time, there was a significant increase in exports of "other tropical timber species" once regulations made it harder to harvest mahogany (period B) and then when mahogany harvesting was made illegal (period C). Exports of all timber products fell once greater enforcement of the law was introduced in 2008. These movements suggest that illegal harvesting of mahogany continued in the guise of 'other' timber until the ban on harvesting was enforced.

Figure 3: Government Intervention and Mahogany and Tropical Timber Exports



Notes: The thick black line is the sum of Brazilian exports of mahogany and other tropical timber species.
Source: Modified from Chimeli, A. B. and Soares, R. R. The Use of Violence in Illegal Markets: Evidence from Mahogany Trade in the Brazilian Amazon, *American Economic Journal: Applied Economics*, forthcoming.

Our two broad research questions are:

1. What impact did government intervention have on equilibrium price, quantity, and welfare?
2. Did the ban on mahogany harvesting increase homicide?

Task A: Welfare Effects of Government Intervention

For this task you need to consider the market for mahogany from a theoretical perspective, i.e. you do not need to analyse data. To simplify the analysis we will assume that there are no externalities involved in the production or consumption of mahogany. (Externalities are discussed in week 9 of the course.)

(a) In an attempt to reduce the harvesting of mahogany, the Brazilian government introduced a tax on producers for each ton of mahogany harvested. Use a demand and supply diagram to illustrate the market for big leaf mahogany before and after the tax. Explain the impact of the tax on equilibrium price, quantity traded, and welfare. (For this question assume a standard downward sloping demand curve and upward sloping supply curve.)

(5 Marks)

(b) In 1998, the Brazilian government introduced a harvesting quota that limited how much mahogany could be harvested. Use a demand and supply diagram to illustrate and explain the impact of the quota on equilibrium price, quantity traded, and welfare. (For this question ignore the existence of the tax.)

(5 Marks)

(c) In 2001, the harvesting of mahogany was made illegal. For each of the following three scenarios, use a separate demand and supply diagram to illustrate and briefly discuss what happens to the equilibrium price and quantity traded. (Hint: consider whether the change affects any of the determinants of demand or of supply, and in which direction.)

i. Producers fear punishment and the consumption of mahogany products becomes undesirable because of the stigma associated with possessing such products.

(3 Marks)

ii. Producers fear punishment and the consumption of mahogany products becomes desirable as consumers derive satisfaction from possessing illegal goods.

(3 Marks)

iii. In 2008, the Brazilian government significantly improved its monitoring of illegal harvesting, enforced the law, and increased penalties for illegal harvesting. Producers fear punishment and there is no change in the desirability of mahogany.

(3 Marks)

(3 + 3 + 3 = 9 Marks Total for (c))

(d) An economist advises the Brazilian government that the tax discussed in (a) above will be ineffective in reducing the harvesting of mahogany if the demand for mahogany is very inelastic. Her advice is that a more effective way to reduce mahogany harvesting is to reduce demand for mahogany. Use a diagram to explain the logic behind this economist's advice.

(8 Marks)

(27 Marks Total for Task A)

Task B: Production Decisions

For this task we consider some of the incentives faced by producers and their production decisions.

(a) According to an OECD report (2007, p. 19-20): "Illegal wood is not burdened by taxes, stumpage fees and expenses for compliance with forest and environmental regulations. It is therefore cheaper to produce than legal wood. … illegal logging is substantially more profitable than the legal kind and that there is therefore a clear financial incentive to engage in illegal activities."

For questions (i) to (iii) below we will compare legal to illegal harvesting. For these questions assume that demand remains the same for both legal and illegal operators and assume that there are numerous competing firms with no barriers to entry or exit.

i. Harvesting mahogany was legal until 2001. With the aid of a diagram illustrate the profit maximising production decision of firms that were legally harvesting mahogany.

(3 Marks)

ii. In 1999 the Brazilian government revoked 85% of harvesting licenses. However, there was little attempt to enforce the law; firms were able to sell mahogany in the guise of other types of timber and illegal trade was enabled by corrupt officials. Moreover, firms that operated illegally no longer needed to meet regulatory requirements and could avoid paying taxes. On the same diagram as (i) above, illustrate and explain the incentives and short-run profit maximising production decisions of firms that are *illegally* harvesting mahogany. (For this question assume that the total number of firms remains unchanged; firms that lose their license to operate legally are replaced by firms who operate illegally.)

(5 Marks)

iii. Now consider what happens if the Brazilian government starts to enforce the law to prevent illegal harvesting. What happens to the operating cost differences between legal and illegal harvesting firms? Explain your reasoning. (No diagrams are required for this question.)

(2 Marks)

(3 + 5 + 2 = 10 Marks)

(b) A Greenpeace report (2001, p. 8) argued that the Brazilian mahogany trade: "is dominated by a small élite group of sawmills and exporters controlled largely by two powerful players: Moisés Carvalho Pereira and Osmar Alves Ferreira. Between them, these two mahogany kings …. control over 80% of the total mahogany timber export trade from Pará."

i. If Greenpeace's depiction is correct, what does it imply about the structure of the mahogany market? Explain your reasoning.

(2 Marks)

ii. Instead of competing against each other, Pereira and Ferreira decide to collude.

1. With the aid of a diagram illustrate and explain the consequences on the price of mahogany and profits for the mahogany kings in the short-run.

(5 Marks)

2. What is the impact of collusion on the health of the mahogany tree population?

(1 Mark)

3. Is collusion between the mahogany kings a sustainable long-run strategy? Explain your answer.

(3 Marks)

(2 + 5 + 1 + 3 = 11 Marks Total for (b))

(21 Marks Total for Task B)

Task C: Impact on the Homicide Rate

Recall from the Background section to this assignment and Figure 3 above, that the 2001 ban on harvesting did not actually reduce harvesting. Instead, firms resorted to illegal harvesting, falsely classifying mahogany as other tropical timber. During this period, disputes erupted between rival firms that were settled outside the justice system, often with violence. For this next task we wish to test whether violence did increase as a result of the ban on mahogany harvesting.

You will need to use the data provided in the Excel file *Mahogany and Homicide* in the *Assignment 1 – Individual Assignment* folder (within the *Assessment Resources* folder) to assess the impact of the banning of mahogany harvesting on homicide in Brazil. The data relate to the period 1995 to 2013 for 128 municipalities in the Pará province of Brazil; 70% of Brazilian mahogany grows in this province. The sample contains 2,432 observations on the homicide rate in these municipalities (128 municipalities for 19 years = 2,432 observations). This type of data is known as panel data. The homicide rate is calculated as the number of homicides per 100,000 inhabitants. The data come from: Chimeli, A. B. and Soares, R. R. The Use of Violence in Illegal Markets: Evidence from Mahogany Trade in the Brazilian Amazon, *American Economic Journal: Applied Economics*, forthcoming.[3] However, you do *not* need to read this study. Note that you can use Excel or any other software to construct the graph and calculate averages required in (a) and (b) below.

(a) Construct a graph of the homicide rate for all Pará municipalities, for the years 1995 to 2013.

(5 Marks)

(b) Using the data provided complete Table 1 below. For this question, you need to calculate the average homicide rate for the four time periods listed in Column (1) of the table. Report the average homicide rate for all mahogany growing areas in Column (2), and the average homicide rate for areas without mahogany in Column (3). In Column (4) report the difference in the homicide rate between areas with mahogany and areas without mahogany.[4] (Hint: you will find these calculations much easier if you sort the data by mahogany growing area *and* by year. This can be done in Excel.)

[3] Web address for the article is: https://www.aeaweb.org/articles?id=10.1257/app.20160055. You can only access this article if you are a member of the American Economic Association. A working paper of an older version of this study can be found at: http://ftp.iza.org/dp5923.pdf.

[4] This type of analysis is known as a difference-in-difference analysis and is very common in the evaluation of various government and business policies.

Table 1: Comparison of average homicide rates, municipalities with and without mahogany, different periods

Period (1)	Areas with mahogany (2)	Areas without mahogany (3)	Homicide rate difference between municipalities (4)
Pre-1999. Pre major government intervention			
1999 to 2001. 85% of licenses revoked			
2001-2008. Harvesting banned			
Post-2008. The law is enforced			

(10 Marks)

(c) What conclusions can you draw from your above graph and calculations regarding the average homicide rate after mahogany trade became illegal?

(2 Marks)

(17 Marks Total for Task C)

Task D: Lessons and Reflections

According to Chimeli and Soares (2017), making mahogany harvesting illegal resulted in 5,171 additional deaths. The aim of this task is to reflect back on Brazil's experience with various interventions in the mahogany market.

(a) What lessons can be learnt by other countries from Brazil's experience regarding (i) the regulation and taxation, and (ii) the abolition of undesirable economic activities and the unintended consequences of government intervention?

(5 Marks)

(b) One of the principles of economics is that rational self-interest can maximize social welfare. However, there are also legitimate concerns for the survival of mahogany and other species and the adverse consequences from deforestation in general.

i. Explain why unregulated harvesting can lead to market failure, e.g., more harvesting than is socially desirable.

(5 Marks)

ii. In addition to the above government interventions, several market based solutions have been implemented or considered.

1. One market solution is to grow mahogany in other countries. Brazil has a natural geographic advantage in growing mahogany. Referring to opportunity cost, explain what is likely to happen to the cost of growing mahogany now that Brazil is no longer a producer?

(2 Marks)

2. Discuss *one* other solution that the market might come up with to reduce the danger of species extinction? (Hint: consider factors that shift the demand or supply of mahogany.)

(3 Marks)

(15 Marks Total for Task D)

END OF ASSIGNMENT 1 TASKS

REFERENCES

Please note that you do not need to read any of the below references. The lecture notes and textbook are sufficient to answer all the tasks in this assignment.

1. Chimeli, A. B. and Soares, R. R. The Use of Violence in Illegal Markets: Evidence from Mahogany Trade in the Brazilian Amazon, *American Economic Journal: Applied Economics*, forthcoming.
2. Contreras-Hermosilla, A., Doornbosch, R., and Lodge, M. 2007. The Economics of Illegal Logging and Associated Trade, OECD, Paris, 8-9 January 2007 https://www.oecd.org/sd-roundtable/papersandpublications/39348796.pdf. Accessed July 6th, 2017.
3. Greenpeace. 2001. *Partners in Mahogany Crime: Amazon at the mercy of 'gentlemen's agreements'*. Greenpeace International, Amsterdam. http://www.greenpeace.org/international/PageFiles/26258/Mahoganyweb.pdf. Accessed July 1st, 2017.
4. Wallace, S. 2013. Mahogany's Last Stand. *National Geographic*. http://ngm.nationalgeographic.com/2013/04/mahogany/wallace-text. April 2013. Accessed July 1st, 2017.
5. World Bank. 2012. *Justice for Forests Improving Criminal Justice Efforts to Combat Illegal Logging*. The World Bank, Washington. http://siteresources.worldbank.org/EXTFINANCIALSECTOR/Resources/Illegal_Logging.pdf. Accessed July 1st, 2017.