**SUMMER TERM 2021**

**COURSEWORK ASSESSMENT COVER SHEET**

**ECON0039: ADVANCED MACROECONOMICS**

**ASSESSMENT COMPONENT:** 100% Open-book coursework assessment

**ASSESSMENT RELEASE:** Friday 30th April 2021 12:00 noon (London time)

**SUBMISSION DEADLINE:** Friday 14th May 2021 12:00 noon (London time)

**SUBMISSION INSTRUCTIONS**

Please read and observe the following instructions to ensure anonymity in marking and compliance with UCL's assessment regulations.

1. **Submission**
    a. All work must be uploaded via Turnitin Assignment / Moodle Assignment using the link provided in the module Moodle page by the submission deadline and following the Module Leader's instructions.
2. **SoRAs and Extenuating Circumstances**
    a. Students with a SoRA, i.e. Reasonable Adjustments arrangements, should submit their work within the time permitted by these arrangements.
    b. If you have extenuating circumstances that affect your ability to submit your work within the submission deadline, you should submit an Extenuating Circumstances claim here. If you need assistance completing the claim, you should contact *your home department*.
3. **Submission Naming and Candidate Number**
    a. Unless instructed otherwise by the Module Leader, all work must be submitted anonymously using a file name that includes the Candidate Number.
    b. You can find your Candidate Number in your Portico account under 'My Studies' and then the 'Examinations' container.
    c. Include your Candidate Number at the top left-hand corner of the first page of your work and in the file name.
4. **Submission Format and Timing**
    a. Unless instructed otherwise by the Module Leader, the file containing your work should be a PDF file. Your work should be typed, with any handwritten/typed diagrams, graphs or algebra scanned in and added to the relevant point in the text, then saved-as-pdf.
    b. Allow sufficient time for submitting your work and once your submission has been accepted by TurnitIn/Moodle, take and save a screenshot. If you experience issues with uploading your work go to Help & Support | Information Services Division - UCL – University College London.

c. If the issue cannot be resolved by contacting ISD, contact the Module Administrator and *not the Module Leader*.

5. **Word-limits for this Assessment**:

   a. The word-limit(s) for this assessment are: see exam

   b. UCL word-limit penalties are specified here: Section 3: Module Assessment | Academic Manual - UCL – University College London.

6. **No Significant Attempt**: You will be awarded a mark of 0% in this assessment when you: (1) do not attempt the assessment or, (2) attempt so little of the assessment that it cannot be assessed. Please refer to Section 3: Module Assessment | Academic Manual - UCL – University College London on the consequences of not making a significant attempt.

7. **Late Submissions**

   a. Markers mark the assessment based on academic merit. If necessary, late submission penalties will be applied administratively after marking.

   b. The assessment submission link will allow work to be submitted up to 2 weeks late. This arrangement is in place for students with permitted extensions due to SoRAs or Extenuating Circumstances.

   c. Late Submission Penalties will be applied according to Section 3: Module Assessment | Academic Manual - UCL – University College London.

8. **Academic Misconduct**

   a. All students should be familiar with UCL's assessment regulations on misconduct: Section 9: Student Academic Misconduct Procedure | Academic Manual - UCL – University College London

   b. Examination offences include (but are not limited to) (self-)plagiarism, unauthorised collaboration, falsification, contract cheating, and falsification of extenuating circumstances. You should be familiar with: Academic Integrity | Students - UCL – University College London.

9. **Examination Queries**: If you suspect that there is an error or ambiguity in one or more questions of your assessment that cannot be clarified using the information you can access on Moodle:

   a. Do not communicate with the Module Leader or any student.

   b. Make a reasonable assumption about what the question means and continue to complete and submit your assessment.

   c. Use the Coursework Query Form available on the module Moodle page to convey your query and, if relevant, any assumptions that you have made to enable you to complete the question(s). Include the completed Coursework Query Form as the first page of your submission.

**SUMMER TERM 2021**

**ECON0039: ADVANCED MACROECONOMICS**

**Coursework assessment**

*All questions should be answered.*

*Part A carries 20% of the total mark, part B 40% and part C 40%. Questions B.1 and B.2 have the same weight.*

By submitting this assessment, I pledge my honour that I have not violated UCL's Assessment Regulations which are detailed in https://www.ucl.ac.uk/academic-manual/chapters/chapter-6-student-casework-framework/section-9-student-academic-misconduct-procedure, which include (but are not limited to) plagiarism, self-plagiarism, unauthorised collaboration between students, sharing my assessment with another student or third party, access another student's assessment, falsification, contract cheating, and falsification of extenuating circumstances.

# PART A : Monetary Policy and Sticky Prices in a "UV" model

THIS PROBLEM considers a monetary model in the UV setting of Lecture 4 on Business Cycles. The economy features a representative firm, a representative household and a Central Bank. The representative household owns the firm and receives its profits $\pi$. There is a unique produced good that can be used for consumption $c$ and investment $x$. Its price is $p$. Money is the numéraire good. It is supplied in quantity $\overline{m}$ by the Central Bank and is distributed to the housholds.

The representative household utility is of the UV form, and is given by

$$U\left(c, \ell, \frac{m}{p}\right) + V(x, \theta) = \ln c - B\ell + \nu \ln\left(\frac{m}{p}\right) + \theta \ln x,$$

where $m$ is the money demand of the household, $\ell$ is labour. Agents demand money because $\frac{m}{p}$ brings some utility.

The household budget constraint is

$$pc + px + m \leq w\ell + \overline{m} + \pi$$

where $w$ is the nominal wage.

The representative firm produces a single good according to the technology $y = A\ell^{\alpha}$ with $0 < \alpha < 1$. $y$ is split into consumption $c$ and investment $x$.

Finally, all markets are competitive.

**Assume first that prices are flexible.**

A.1 Write the profit maximization problem of the firm and the first order conditions to this maximization. Derive good supply $y$, labour demand $\ell^d$ and profit $\pi$ as a function of $w$, $p$ and parameters.

A.2 Write the utility maximization problem of the household and the four first order conditions to this maximization, with respect to $c$, $x$, $\ell$ and $m$. Derive consumption demand $c$, investment demand $x$, money demand $m$ and labour supply $\ell^s$ as a function of $w$, $p$, $\pi$, $\overline{m}$ and parameters.

A.3 Define the general equilibrium of this economy. Find the equilibrium levels of quantities $c^E, \ell^E, x^E, y^E$ and $m^E$, wage $w^E$ and price $p^E$.

A.4 Can a technology shock ($\partial A > 0$), an investment demand shock ($\partial\theta > 0$) or a monetary policy shock ($\partial\overline{m} > 0$) create business cycles comovements? Discuss.

**Assume now that the price of the good is fixed at a level $p^F > p^E$.** Let's consider a fix-price "equilibrium" in which the money market clears, but the good and labour market may not. We assume *voluntary exchange*, meaning that households are not forced to work or spend more than what is optimal for them, neither are firms forced to hire or produce more that what is optimal for them.

Because $p^F > p^E$, the structure of the equilibrium will be as follows. Money market will be in equilibrium, which will determine equilibrium wage $w^F$. Output $y^F$ will be determined by good demand $c^F + x^F$. To that level of output will correspond a demand for labour $\ell^F$. That level of labour demand will be the equilibrium employment.

A.5 Find the fix-price equilibrium values $c^F, \ell^F, x^F, y^F, m^F$ and $w^F$.

A.6 Can a technology shock ($\partial A > 0$), an investment demand shock ($\partial\theta > 0$) or a monetary policy shock ($\partial\overline{m} > 0$) create business cycles comovements in that fix-price economy? Discuss.

## PART B : Questions

ARE the following statements true, false or uncertain? You should give a structured answer in no more than one page.

B.1 Medical improvements increase income per capita and population in the Malthusian regime.

B.2 High inflation reduces money demand *ceteris paribus*.

## PART C : Discussion

BELOW is an article published in The Economist in November 2021 and entitled "Deconstructing the Lebanese central bank's Ponzi scheme" As always in The Economist, the article is not signed. Read carefully this article before answering the questions below. For each question, you should propose a structured answer.

C.1 Write a 10-line summary.

C.2 Use the three figures of that article to assess Lebanon macro-financial situation. (no longer than one page (roughly 500 words))

C.3 Why is the current Lebanese situation typical of an episode of hyperinflation? (not more than roughly 500 words)

C.4 Assume that you are leading an IMF mission to Lebanon. Which actions would you suggest to end hyperinflation. Why? What else would you suggest to do? (not more than roughly 500 words)

"Deconstructing the Lebanese central bank's Ponzi scheme "
*The Economist*, Nov 5th 2020

**A web of mutual liabilities binds the central bank to the government and the banks**

George Azzi no longer allows customers inside his pharmacy. Too many shops have been robbed. Instead he takes orders through a plexiglass window. But now, he jokes, there is not much left to steal. A currency crisis has left his shelves half-empty. A nearby petrol station has rationed supplies, limiting drivers to 20 litres. The supermarket around the corner has not stocked fresh chicken for weeks because poultry farmers will not sell at the government-mandated price.

Lebanon has spent the past year lurching from one crisis to the next: protests, covid-19, the catastrophic explosion at Beirut's port on August 4th. In the background all along has been a grinding economic collapse. Pegged for decades at 1,500 to the dollar, the Lebanese pound recently traded on the black market as low as 9,000. Annual inflation hit 120% in August. GDP may shrink by a quarter this year.

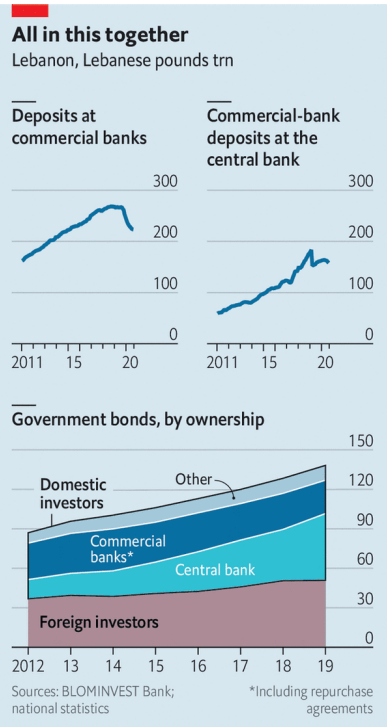
Subsidies have kept a few essentials affordable: medicine, fuel, a morning manoucheh (flatbread). But the central bank, the Banque du Liban (BdL), has less than $2bn in usable foreign-currency reserves remaining. By the year's end it will be unable to maintain its subsidy scheme, through which it grants importers of essential goods access to dollars at preferential rates. Some Lebanese have begun hoarding food and medicine in anticipation of far higher prices.

It will be the end of a monetary regime that once seemed inviolable. The peg helped restore confidence after a 15-year civil war, during which inflation peaked at 487% and the pound lost 80% of its value. But it was built on an unproductive economy and a complex series of transactions that, in recent years, came to resemble a Ponzi scheme. It has now collapsed. Yet Lebanon's political and financial elites–sometimes one and the same–are unwilling to bear the costs of fixing it. Instead they have forced the economy into a brutal self-correction, with the heaviest consequences piled on ordinary citizens.

Most Arab states with fixed currencies defend their pegs with revenue from oil and gas exports. Lebanon has none. It has few goods exports at all: at their peak in 2012 they came to $4.4bn, against $21.1bn in imports. Other sources of hard currency, such as tourism and property, were insufficient to sustain a peg, with current-account deficits exceeding 25%, and fiscal deficits of over 10%, of GDP.

It did have one reliable source of dollars: a vibrant financial sector that, at its peak in 2018, held 269trn pounds of deposits, then worth $179bn–more than three times the country's GDP. About two-thirds of deposits were in dollars. To funnel some of that into its coffers the BdL crafted a scheme it called "financial engineering". Starting in 2016 it exchanged local-currency debt with the finance ministry for dollar-denominated bonds, which it sold to commercial banks with high rates of return.

Banks could also borrow pounds against their dollar deposits at the BdL, then lend them back to it, with a spread of 11 percentage points on the transaction.




The longtime central-bank governor, Riad Salamé, defends the scheme as a short-term fix. In his telling the BdL did not create Lebanon's deficits: those were the work of politicians who failed even to pass a budget between 2005 and 2017. True enough–but the scheme made those debts possible and tied everyone in a web of mutual liabilities. By 2018 the BdL was financing most of the fiscal deficit, and by 2019 most of Lebanon's public debt (more than 80% of local-currency debt and 60% of foreign-currency bonds) was owned by banks and the BdL. The banks, in turn, deposited more than half their liquidity with the BdL. In its annual assessment of the Lebanese economy, the IMF reckoned that banks' combined exposure to the BdL and the government amounted to 69% of their total assets in May 2019, more than eight times their Tier 1 capital, largely due to the rise in their deposits with the central bank.

Sustaining this house of cards required an ever larger supply of fresh dollars, which necessitated ever higher yields to lure depositors. Average interest rates on dollar deposits climbed from 3% in 2016 to almost 7% three years later. But after a decade of growth, bank deposits flattened off in late 2018, in part because low oil prices hurt the Gulf economies where many Lebanese work. Last year they began to decline. Short of cash, banks severely curtailed dollar withdrawals. Credit cards that once financed trips to Europe now carry spending limits of $50. In March the state defaulted when it failed to make a payment of $1.2bn on a hard-currency bond. The prime minister at the time, Hassan Diab, estimated an $83bn loss in the banking sector.

Most customers can withdraw their dollar savings only in local currency (Dan Azzi, a former executive at Standard Chartered, a bank, dubbed these "lollars"). Since April the BdL has allowed withdrawals at an above-market exchange rate, currently 3,900 pounds to the dollar. That is still up to 55% below the black-market rate–"a massive haircut on the Lebanese," says Alain Bifani, who resigned in June after 20 years as the director-general of the finance ministry. Despite the haircut, people have rushed to withdraw deposits. Cash in circulation was up 274% in the year to August.

Mr Diab proposed shifting more of the losses on to banks, rather than entirely on their depositors. His cabinet approved a plan in April calling for a bail-in, wiping out shareholders and imposing a haircut on wealthy depositors. He also began talks with the IMF about a financial agreement worth

up to $10bn. The fund was broadly supportive of his plan, but it was doomed by lobbying from banks. They have strong allies in parliament: most of Lebanon's big banks are at least partly owned by politicians or their families. In meetings with the IMF, bankers would not even agree on the scale of Lebanon's losses, insisting that Mr Diab's numbers were exaggerated.

Mr Diab has since resigned as prime minister, though he remains caretaker. His designated successor, Saad Hariri, who is still struggling to cobble together a government, is unlikely to take up his ideas. He had been prime minister before, when the financial-engineering scheme was in full swing, and his family has a stake in BankMed, one of the country's largest banks (his stepmother serves as vice-chair). Instead the association of banks has suggested selling $40bn in state assets to help clean up the mess. Critics argue this wildly overstates the value of Lebanon's assets, among them an electric company that cannot provide 24-hour electricity and a telecoms monopoly that offers some of the world's slowest internet speeds. Neither is likely to prompt a bidding war when a bankrupt state dumps them in a fire sale.

The BdL, once again, is left to pursue its policies, some of which seem to be attempts to keep the Ponzi scheme going. In August it told banks to boost their capital by 20% or "exit the market" in February next year. Depositors who have transferred at least $500,000 abroad since 2017 would be encouraged to repatriate 15% of that sum, and 30% for politically exposed persons. Banks may offer "incentives" to grease the wheels. What would incentivise customers to send money to an insolvent banking system was left unclear. Efforts to audit the central bank, meanwhile, have met with months of obstruction.

Even the good news is bad. The trade deficit fell by 51% in the first quarter, but mainly because few Lebanese can afford imported goods. Banks have fewer liabilities–customer deposits were down by 16% in August, compared with the previous year–but partly because depositors who need cash are taking haircuts to withdraw devalued pounds. Politicians and bankers still hope to avoid a reckoning, even as the economy crumbles around them. But they have nowhere left to turn.