

# International macroeconomics (2023–2024)

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Surname: \_\_\_\_\_

First name: \_\_\_\_\_

ID or passport number: \_\_\_\_\_

Question	Points	Obtained
1	8	
2	8	
3	8	
4	8	
5	8	
Total	40	

## Instructions

The exam consists of **five questions**.

In total, it is possible to obtain up to **40 points**.

Duration of exam: **1 hour and 20 minutes** (= 2 minutes per point or 16 minutes per question).

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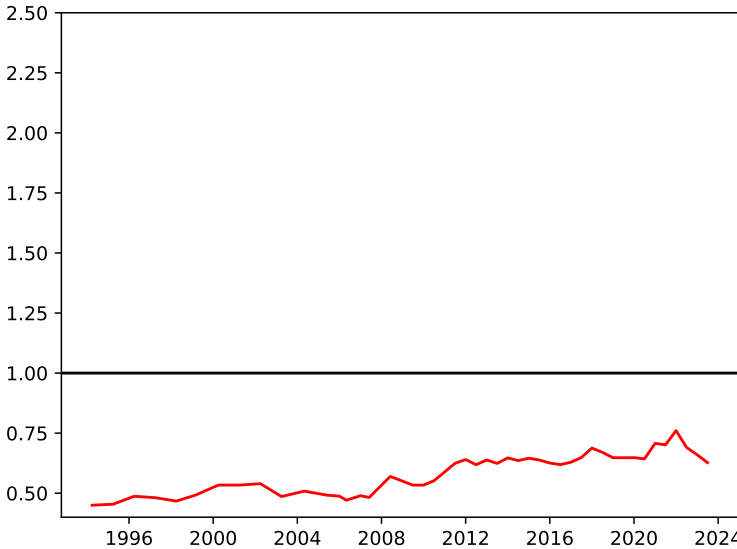


Figure 1: Real exchange rate of China vis-à-vis the United States,  $Q_t$ , based on Big Mac prices. Source: The Economist ([www.economist.com/big-mac-index](http://www.economist.com/big-mac-index)), author’s calculations.

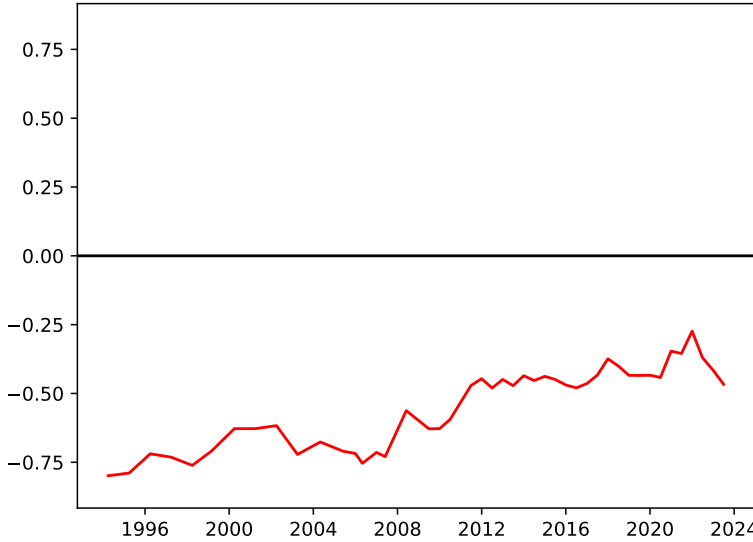


Figure 2: Natural logarithm of the real exchange rate of China vis-à-vis the United States,  $q_t$ , based on Big Mac prices. Source: The Economist ([www.economist.com/big-mac-index](http://www.economist.com/big-mac-index)), author’s calculations.

Date	$Q_t$	$q_t$
01/04/1994	0,450	-0.799
01/04/1995	0.454	-0.789
01/04/1996	0.487	-0.719
01/04/1997	0.481	-0.732
01/04/1998	0.467	-0.761
01/03/1999	0.492	-0.709
01/04/2000	0.534	-0.628
01/04/2001	0.534	-0.628
01/04/2002	0,540	-0.617
01/04/2003	0.486	-0.721
01/05/2004	0.509	-0.676
01/06/2005	0.492	-0,710
01/01/2006	0.488	-0.718
01/05/2006	0.471	-0.754
01/01/2007	0,490	-0.714
01/06/2007	0.482	-0.729
01/06/2008	0,570	-0.562
01/07/2009	0.533	-0.629
01/01/2010	0.534	-0.628
01/07/2010	0.552	-0.595
01/07/2011	0.624	-0.471
01/01/2012	0,640	-0.446
01/07/2012	0.619	-0,480
01/01/2013	0.638	-0.449
01/07/2013	0.624	-0.472
01/01/2014	0.647	-0.435
01/07/2014	0.636	-0.453
01/01/2015	0.645	-0.438
01/07/2015	0.638	-0.449
01/01/2016	0.626	-0.469
01/07/2016	0.619	-0,480
01/01/2017	0.629	-0.464
01/07/2017	0.648	-0.433
01/01/2018	0.688	-0.374
01/07/2018	0,670	-0,400
01/01/2019	0.648	-0.434
09/07/2019	0.648	-0.434
14/01/2020	0.648	-0.434
01/07/2020	0.643	-0.442
01/01/2021	0.707	-0.346
01/07/2021	0.701	-0.355
01/01/2022	0.761	-0.274
01/07/2022	0.691	-0,370
01/01/2023	0,660	-0.415
01/07/2023	0.627	-0.467

Table 1: Real exchange rate based on Big Mac prices of China vis-à-vis the United States.



- (e) As far as its real exchange rate is concerned, has China become more or less competitive over the last three decades, or has its competitiveness not changed? [1]
- (f) Notwithstanding (= regardless of) your answer to the previous question, if you look at its current account balance in recent years, would you say that China is competitive in international trade or not? [1]
- (g) What is the real exchange rate equal to in the currency flow model? [1]
- (h) What can the Chinese central bank do to avoid, or at least mitigate, a real appreciation of the Chinese yuan? [1]

Total of question 1: [8]

2. In class, we have seen a two-period model of the current account, which is known under the name "intertemporal approach to the current account".

(a) Please state the equations of the model, but do not solve it mathematically. [1]

(b) Very briefly, why is the model known as the "*intertemporal* approach"? In other words, why does the name of the model emphasize the intertemporal nature of the model? [2]

(c) A key result of the model is that consumers "smooth consumption". Explain why this result is a consequence of the shape of the utility function. In other words, explain what shape is assumed for the utility function and why this specific shape implies that consumers want to smooth consumption. [2]

(d) What implication does the fact that consumers smooth consumption have for the determination of the current account? In other words, how is the current account determined in the intertemporal approach to the current account, and how do changes in the current account come about? [2]

(e) What would the utility function have to look like to induce consumers to consume everything in one period and nothing in the other? [1]

Total of question 2: [8]

3. Consider a representative consumer who wants to maximize:

$$\max_{C^{HH}, C^{HF}, x^{HF}} u(C^{HH} + C^{HF}), \quad (1)$$

subject to the two constraints:

$$P^H C^{HH} = P^H Y^H - x^{HF}, \quad \text{LM: } \lambda^{:HC}, \quad (2)$$

$$P^F C^{HF} = \quad + Sx^{HF}, \quad \text{LM: } \lambda^{:FC}. \quad (3)$$

(a) Describe briefly what the different variables stand for. [2]

(b) Write down the Lagrangian for the constrained optimization problem. [1]

(c) Write down the three first-order conditions. [2]



(d) What is  $S$  equal to in the optimum. [1]

(e) What is  $Q$  equal to in the optimum. [1]

(f) i) Does purchasing power parity (PPP) hold? [1]

ii) Would the result change if the representative consumer's objective function was  $u(C^{\text{HH}}) + u(C^{\text{HF}})$  instead of  $u(C^{\text{HH}} + C^{\text{HF}})$ ?

Total of question 3: [8]

Assets	Liabilities
$K^H$	$w^H$
$E^{HH}$	$E^{HH}$
$E^{HF}$	$E^{FH}$
$B^{HH}$	$B^{HH}$
$B^{HF}$	$B^{FH}$
$M^{HH}$	$M^{HH}$
$M^{HF}$	$M^{FH}$
$B^{\bar{H}F}$	$B^{\bar{F}H}$

Table 2: Balance sheet of the home economy.

Assets	Liabilities

Table 3: Balance sheet of the home economy - first simplification.

4. In table 2, you can see a detailed balance sheet of the home economy. Please use the empty tables 3 to 5 to simplify the balance sheet of the domestic economy as much as possible in three steps. For each step, indicate briefly why you can simplify the balance sheet in the way you do.

[8]

Assets	Liabilities
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Table 4: Balance sheet of the home economy - second simplification.

Assets	Liabilities
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Table 5: Balance sheet of the home economy - third simplification.

Total of question 4: [8]

5. (a) A Spanish resident sells a *new* car to a foreigner. Please show how this transaction is recorded: [4]

i) In the *published* balance of payments:

ii) In the *analytical* balance of payments:

iii) In the production identity:  $Y^P = Y^E + TB$ :

iv) In the national income identity:  $Y = Y^E + CA$ :

(b) Now suppose that the car that the Spanish resident sells to the foreigner is a *second-hand* car. What would change in your answers to the previous part of this question? [2]

- (c) International transactions are always recorded twice in the balance of payments. Most transactions are exchanges and therefore automatically "two-sided". However, the *published* balance of payments also provides two categories that are used when transactions are "one-sided" (transactions without a *quid pro quo*). Please state the two subcategories in question and provide an example of a transaction for each of them. [2]

Total of question 5: [8]

