# ECON 4311 − Economy of Latin America
## Lecture 10C: Macroeconomic Policy in Latin America

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# Outline

## Introduction

▶ In past lectures, we have talked about some of the effects that fiscal and monetary policies have had on Latin America, including:

- Industrial policy.

- Trade policy.

- Exchange-rate policy.

▶ Before the break, your classmates presented:

- Lessons from the Monetary and Fiscal History of Latin America.

- The Monetary and Fiscal History of Argentina, 1960–2017.

▶ The common denominator in all these topics is that chronic instability in the region can be linked to inappropriate macroeconomic policy.

# Introduction

▶ **Today, we look at some aspects of fiscal and monetary policy.**

▶ Looking at these econ policies may be useful to answer questions like:

   *"¿En qué momento se jodió el Perú?"* ∼ Mario Vargas Llosa

▶ Our focus is in the post-war (1945–) period, due to data availability.

▶ Already know some important things that happened in this period:

   • Macroeconomic imbalances started in the 1950s with ISI policies, and continued well through the 1970s.

   • Things ended badly in 1980s with default episodes and the Lost Decade

# Government Budget Constraint

▶ Common accounting framework used by Kehoe, Nicolini and co-authors to understand economic policies in Latin America. (Book)

  • Common approach that goes back many years.

▶ **Fiscal and monetary policy interconnected via the government's budget constraint**:

$$B_t + B_t^* E_t + M_t = P_t(D_t + X_t) + (1 + r_{t-1})B_{t-1} + (1 + r_{t-1}^*)B_{t-1}^* E_t + M_{t-1} \quad (1)$$

$B_t$: stock of domestic currency-denominated debt
$B_t^*$: stock of dollar-denominated debt
$E_t$: pesos-per-dollar nominal exchange rate        $M_t$: money balances
$D_t$: primary deficit        $X_t$: residual that makes BC hold (e.g., taxes/transfers)
$P_t$: domestic price level        $r_{t-1}$ : interest rate on debt

# Government Budget Constraint

▶ Divide both sides of equation (1) by nominal GDP ($P_t Y_t$) to obtain:

$$
\underbrace{\frac{B_t}{P_t Y_t}}_{\equiv \theta_t} + \underbrace{\left(\frac{E_t P_t^*}{P_t}\right)}_{\equiv \xi_t} \underbrace{\frac{B_t^*/P_t^*}{Y_t}}_{\equiv \theta_t^*} + \underbrace{\frac{M_t}{P_t Y_t}}_{\equiv m_t}
$$

$$
= \underbrace{\frac{P_t(D_t + X_t)}{P_t Y_t}}_{\equiv P_t(d_t + x_t)} + \underbrace{\left(\frac{P_{t-1} Y_{t-1}}{P_t Y_t}\right)}_{\equiv (\pi_t g_t)^{-1}} \underbrace{\frac{(1+r_{t-1})B_{t-1}}{P_{t-1} Y_{t-1}}}_{\equiv (1+r_{t-1})\theta_{t-1}} \tag{2}
$$

$$
+ \underbrace{\left(\frac{E_t P_t^*}{P_t}\right)}_{\equiv \xi_t} \underbrace{\left(\frac{P_{t-1} Y_{t-1}}{P_t^* Y_t}\right)}_{\equiv (\pi_t^* g_t)^{-1}} \underbrace{\frac{(1+r_{t-1}^*)B_{t-1}^*/P_{t-1}^*}{Y_{t-1}}}_{\equiv (1+r_{t-1}^*)\theta_{t-1}^*} + \underbrace{\frac{P_{t-1} Y_{t-1}}{P_t Y_t}}_{\equiv (\pi_t g_t)^{-1}} \underbrace{\frac{M_{t-1}}{P_{t-1} Y_{t-1}}}_{\equiv m_{t-1}},
$$

where $P_t^*$ is US price level, and let $d_t \equiv D_t/(P_t Y_t)$, $x_t \equiv X_t/(P_t Y_t)$.

# Government Budget Constraint

▶ Doing some more algebraic manipulations, we can write:

$$(\theta_t - \theta_{t-1}) + \xi_t(\theta_t^* - \theta_{t-1}^*) + (m_t - m_{t-1}) + \left(1 - \frac{1}{g_t \pi_t}\right) m_{t-1}$$
$$= d_t + \left(\frac{(1 + r_{t-1})}{g_t \pi_t} - 1\right)\theta_{t-1} + \xi_t\left(\frac{(1 + r_{t-1}^*)}{g_t \pi_t} - 1\right)\theta_{t-1}^* + x_t, \quad (3)$$

where:

- $\theta_t - \theta_{t-1}$: domestic debt issuance.
- $\xi_t(\theta_t^* - \theta_{t-1}^*)$: foreign-debt issuance, converted to local currency.
- $(m_t - m_{t-1})$: money issuance.
- $\left[1 - (g_t \pi_t)^{-1}\right] m_{t-1}$: seigniorage.
- $d_t$: primary deficit.
- $\left[(1 + r_{t-1})(g_t \pi_t)^{-1} - 1\right]\theta_{t-1}$: domestic debt service
- $\left[(1 + r_{t-1}^*)(g_t \pi_t^*)^{-1} - 1\right]\theta_{t-1}^*$: foreign debt service.
- $x_t$: transfer/residual that makes budget constraint hold.

# Government Budget

▶ **Government budget balance** ≡ gvt. revenues − gvt. expenditures.

▶ We say that there is a **deficit** in the government budget if − balance.

▶ We say that there is a **surplus** in the government budget if + balance.

▶ In post-war period, LatAm countries have typically registered large government budget deficits.

- Not enough revenues (i.e., taxes) to cover government spending.

- These deficits have been too often (partly) financed by printing money.

# Fiscal Policy

Most economists agree in that it is a good idea for the government to conduct **counter-cyclical fiscal policy**. How does it work?

▶ Suppose the economy is operating at its potential GDP.* Then, the government should run a balance budget (revenues = expenditures).

▶ If the economy is operating above its potential GDP, the government should run a surplus (revenues > expenditures).

- Reduce government expenditure and/or increase taxes.

▶ If the economy is operating below its potential GDP, the government should run a deficit (revenues < expenditures).

- Increase government expenditure and/or reduce taxes.

*\***Potential GDP.** GDP produced at full (or NAIRU) level of employment.

# Fiscal Policy

**Fiscal policy in Latin America until the 1990s**:

▶ Governments ran perpetual deficits.

- **1970s:** Moderate deficits.

- **1980s:** Large deficits.

- **After 1990s:** Declining deficits.

# Fiscal Deficits in Latin America (as % of GDP)

| | 1970s[a] | 1980s[a] | 1982[b] | 1987[b] | 1990s[c] | 2000s[c] | 2017[d] |
|---|---|---|---|---|---|---|---|
| Argentina | −3.86 | −0.71 | −7 | −4 | −0.81 | 0.11 | −6.0 |
| Bolivia | −4.2 | −3.65 | −16 | 1 | −2.76 | −3.6 | −5.0 |
| Brazil | −0.64 | −14.61 | −3 | −12 | −5.5 | −3.89 | −7.7 |
| Chile | 0 | 0 | −1 | 0 | 1.46 | 2.55 | −2.8 |
| Colombia | 0 | 0 | −5 | −1 | −1.03 | −1.83 | −3.7 |
| Costa Rica | −3.89 | −1.76 | −1 | −3 | −2.96 | −2.11 | −6.2 |
| Ecuador | −1.4 | −1.1 | −4 | −2 | −1.72 | 1.53 | −6.0 |
| El Salvador | −0.88 | −11.03 | −8 | 1 | −1.98 | −1.88 | 0.0 |
| Guatemala | −1.34 | −2.96 | −5 | −1 | −0.96 | −1.71 | −1.3 |
| Honduras | −1.05 | −5.34 | − | − | −3.03 | −3.11 | −2.8 |
| Mexico | − | −7.92 | −15 | −14 | −0.4 | −0.45 | −1.0 |
| Nicaragua | −5.56 | −2.32 | −20 | −17 | −1.73 | −2.43 | −0.6 |
| Panama | −7.29 | −5.02 | −11 | −4 | −0.61 | −1.01 | −2.9 |
| Paraguay | 0 | 0 | 0 | 0 | −0.65 | −0.84 | −1.1 |
| Peru | −3.07 | −5.29 | −3 | −6 | −2.97 | −0.74 | −3.6 |
| Uruguay | −0.95 | −2.07 | −9 | −1 | −3.3 | −2.19 | −3.0 |
| Venezuela | −0.44 | −1.19 | −4 | −4 | −1.9 | 0.09 | − |
| Latin America | −2.16 | −3.82 | −7 | −4 | −1.82 | −1.27 | −3.4 |

Notes: (a) Computed by authors using IMF GFSM database (1986); (b) Edwards (1995); (c) IDB Latin America and Caribbean Macro Watch Tool; (d) ECLA and the Caribbean CEPALSTAT.

# Financing Government Budget Deficits

Deficit: Government budget balance $\equiv$ revenues $-$ expenditures $< 0$.

**How to pay for expenditures?**

1. Borrow money (i.e., sell bonds to domestic or foreign investors).

    - Specially costly after default episodes of the 1980s.

2. Collect taxes.

3. Print money (i.e., "seigniorage").

# Financing Government Budget Deficits

1. **In Latin America, many governments decided to (partly) finance their deficits with the creation of money.**

   - This is generally a bad idea: it can cause significant economic problems.

2. Next, let's try to understand:

   - How the supply of money is determined.

   - Problems associated with financing through seigniorage.

# Inflation

▶ **Inflation rate**. Rate at which the general price level of goods and services rises in an economy. Formally,

$$\pi_t = \frac{P_t - P_{t-1}}{P_{t-1}},$$

where $P_t$ is some price level (typically an index of a representative basket of goods and services).

- A typically-used measure of inflation is *Consumer Price Index* (CPI).

▶ With this definition, we can write:

$$\frac{P_t}{P_{t-1}} = 1 + \pi_t.$$

- When $\pi_t < 0$, we say that the economy experiences deflation.

# Monetary Base and Money Supply

▶ **Monetary base**. Cash in hands of the public and reserves of the banking system. Formally,

$$B = C_p + R,$$

- $B$: monetary base.
- $C_p$: cash in hands of the public.
- $R$: reserves of the banking system (i.e., part of deposits that banks are mandated to hold).

▶ **Money supply**.

$$M_s = \frac{B}{r},$$

- $M_s$: money supply.
- $r$ is the fraction of deposits that banks are mandated to hold/not loan.

# Financing Fiscal Deficits with Money Creation

▶ **Printing money can have substantial effects on money supply**, that ultimately depend on the banking money multiplier $1/r$.

▶ The banking money multiplier is the multiple by which a change in $B$ translates into a change in the money supply.

- If $r = 0.1$, then the money multiplier is 10.

- If $B$ changes by 1 peso, then money supply increases by 10 pesos. (For this reason, many refer to $B$ as high-powered money).

▶ **Example**. Suppose $r = 0.1$, and that government prints \$100 for Thanksgiving. If government deposits \$100 in the bank, the bank must keep \$10 (by law) as reserves. If the bank loans the remaining \$90 to someone else, it creates "new money."

# Financing Fiscal Deficits with Money Creation

▶ **Question**: How does a fiscal deficit affect the money supply?

- Suppose government is denied credit in financial markets and needs to raise money to cover the deficit.

- Consider the following data:

| GDP | B | Ms | Deficit | ΔB | ΔMs |
|-----|-----|-----|-----|-----|-----|
| 1 trillion | 10 billion | 100 billion | 50 billion | 50 billion | 500 billion |

- Suppose government spending is 20% of GDP, and tax revenues are 15% of GDP.

- If the government decides to print money (i.e., increase $B$) to cover the deficit, it must print 50 billion pesos.

- Printing 50 billion pesos results in a 500 billion pesos increase in the money supply with $r = 0.1$.

# Financing Deficits with Money Creation: Central Banks

▶ **The central bank is in charge of managing money supply.**

- It may (or may not) lend to the government.
  - ▶ Extremely rare to see this type of lending in high-income economies.
  - ▶ No obligation to loan to government if central bank is independent.
  - ▶ Central banks in Latin America became independent in the 1990s.

▶ Typically, governments finance fiscal deficits by borrowing from financial markets (i.e., selling bonds to domestic or foreign investors).

▶ An alternative to this practice is to borrow directly from the central bank. This is commonly referred to as **debt monetization**.

▶ **Debt monetization**. Instead of selling more bonds or raising further taxes, the government borrows money form the central bank in order to finance public spending. (This is essentially creating new money.)

# Financing Deficits with Money Creation: Central Banks

▶ Prior to the independence of the central banks, fiscal policy in Latin America determined monetary policy.

- Whoever was running the government basically determined the amount of money to be printed.

▶ Fiscal deficits used to be the norm, and so was money creation.

▶ Money creation has been (and still is) a serious problem in much of Latin America.

▶ Reinhart and Rogoff: "*Latin America would've done better in terms of economic stability had the printing press never crossed the Atlantic*".

# Changes in Money Supply in LatAm (avg. annual percentage change)

As fiscal deficits increased, so did the growth rates of money supply.

|  | 1960s | 1970s | 1980s | 1990s | 2000s | 2017 |
|---|---|---|---|---|---|---|
| Argentina | 26.7 | 117.7 | 657.8 | 129.2 | 22.7 | 30.1 |
| Bolivia | 14 | 22.5 | 605.9 | 19.7 | 29 | 10 |
| Brazil | 52.7 | 40.6 | 311.8 | 803.8 | 15.5 | 4.2 |
| Chile | 40.4 | 169.5 | 25.6 | 20.3 | 17.1 | 0.6 |
| Colombia | 19.1 | 24.1 | 22.9 | 23.4 | 15.1 | 6.8 |
| Costa Rica | 9.6 | 20.9 | 28.3 | 25.4 | 24.5 | 1.5 |
| Ecuador | 10.2 | 20.2 | −5.1 | 6 | 17.9 | −20.6 |
| El Salvador | 4.8 | 16.9 | 3.6 | 6.8 | 7.6 | 11 |
| Guatemala | 5.1 | 16.1 | 14.2 | 20.8 | 15 | 7.3 |
| Honduras | 10.4 | 14.1 | 10.9 | 22.5 | 13.1 | 13.9 |
| Mexico | 11.8 | 23 | 56.9 | 34.2 | 14.9 | 11.1 |
| Nicaragua | 8.2 | 22.7 | 1553.6 | 778.5 | 20.7 | 16 |
| Panama | 8.6 | 14.4 | 1 | 14.6 | 2.9 | – |
| Paraguay | 9.6 | 23.4 | 25.8 | 18 | 22.7 | 10.7 |
| Peru | 16.5 | 33.8 | 300.2 | 717.6 | 9 | 9.3 |
| Uruguay | 48.9 | 58.5 | 53.6 | 47.9 | 26.7 | 1.9 |
| Venezuela | 7.2 | 22.4 | 13.1 | 52.8 | 43.7 | 58.8 |
| Latin America | 17.9 | 38.9 | 215.3 | 161.3 | 18.7 | 10.7875 |

# Financing Fiscal Deficits with Money Creation

▶ So far, we have draw the connection between fiscal deficits and money creation in the region:

- Fiscal deficit $\rightarrow$ money creation.

▶ Next, establish the relationship between money creation and inflation.

- Money creation $\rightarrow$ inflation.

# Money Supply and the Price Level

▶ **The equation of exchange**:

$$M_t \cdot V_t = P_t \cdot Q_t,$$

where:

- $M_t$: (nominal) money supply.
- $V_t$: velocity of money (i.e., frequency at which 1 unit of money spent).
- $P_t$: price level.
- $Q_t$: real GDP.

▶ Equation of exchange is a re-arrangement of the definition of velocity:

$$V_t = \frac{P_t Q_t}{M_t}.$$

"*The velocity at which money travels is determined by the level of nominal expenditures over the amount of money in circulation*"

# Money Supply and the Price Level

Consider:

$$M_t \cdot V = P_t \cdot Q_t,$$

▶ **Class Exercise**.

- Suppose that from year $t$ to $t + 1$, Venezuela has a potential real GDP growth of 0%.

- **Question**: If the money supply grows at rate $g_M$, what happens to the price level of this economy?

- Answer. (1 bonus point for correct answer).

# Money Supply and the Price Level

Consider:

$$M_t \cdot V = P_t \cdot Q_t,$$

▶ **Class Exercise**.

- Suppose that from year $t$ to $t + 1$, Venezuela has a potential real GDP growth of 0%.

- **Question**: If the money supply grows at rate $g_M$, what happens to the price level of this economy?

- Answer. (1 bonus point for correct answer).

  ▶ If $g_M > 0$, there is inflation.

  ▶ If $g_M = 0$, the price level remains stable.

  ▶ If $g_M < 0$, there is deflation.

# Money Supply and the Price Level

▶ **The equation of exchange**:

$$M_t \cdot V_t = P_t \cdot Q_t,$$

▶ **Usual assumptions**:

- Money travels at constant velocity (i.e., $V_t = V$ for all $t$).
- Real GDP grows at a constant rate (i.e., $Q_{t+1}/Q_t = 1 + g_Q$ for all $t$).

▶ **Monetary authority's objective**: price stability ($P_{t+1}/P_t = 1, \forall t$).

▶ Taking the ratio of the equation of exchange at $t + 1$ and $t$ under the usual assumptions:

$$\frac{M_{t+1}}{M_t} = \frac{P_{t+1}}{P_t}(1 + g_Q) \qquad \Longrightarrow \qquad \frac{P_{t+1}}{P_t} = \frac{1 + g_M}{1 + g_Q}.$$

"*Price stability requires that the supply of money grow at exactly the same rate as real GDP*"

# Deficits in Latin America through Equation of Exchange

▶ Using the equation of exchange under standard assumptions:

$$\frac{P_{t+1}}{P_t} = \frac{1 + g_M}{1 + g_Q}.$$

▶ **Fiscal deficits in Latin America**:

- Governments eventually became unable to borrow in financial markets.

- Central banks obliged to borrow money to governments.

  ▶ Expansion of monetary base.

  ▶ Further increase of money supply due to money multiplier ($1/r$).

  ▶ Easy for such an expansion to surpass real GDP growth (i.e., $g_M > g_Q$).

  ▶ Ultimately, lage increase in the price level (a.k.a. inflation)!

▶ Fiscal deficit → Money creation → Inflation.

# Inflation Rates in Latin America (%)

Table: (Rounded) Inflation rates in Latin America (%)

| 1960s | 1970s | 1980s | 1990s | 2000s | 2010s |
|-------|-------|-------|-------|-------|-------|
| 4 | 10 | 15 | 10 | 5 | 3 |

**Figure Notes**. Data from the FRED. Series: FPCPITOTLZGLCN.

# Changes in Inflation Rates in Latin America (%)

|  | 1960s | 1970s | 1980s | 1990s | 2000s | 2017 |
|---|---|---|---|---|---|---|
| Argentina | 22.4 | 132.9 | 565.7 | 252.9 | 8.9 | – |
| Bolivia | 5.7 | 15.9 | 1383.2 | 10.4 | 5.1 | 2.8 |
| Brazil | – | – | 354.5 | 843.3 | 6.9 | 3.4 |
| Chile | 26.6 | 174.6 | 21.4 | 11.8 | 3.7 | 2.2 |
| Colombia | 11.5 | 19.7 | 23.5 | 22.2 | 6.3 | 4.3 |
| Costa Rica | 2.1 | 9.8 | 27.1 | 16.9 | 10.9 | 1.6 |
| Ecuador | 4.4 | 11.9 | 34 | 39 | 17.8 | 0.4 |
| El Salvador | 0.4 | 9.3 | 18.5 | 10.6 | 3.6 | 1 |
| Guatemala | 0.7 | 8.9 | 12.1 | 14.8 | 7 | 4.4 |
| Honduras | 2.3 | 6.6 | 7.4 | 19.7 | 8.2 | 3.9 |
| Mexico | 2.5 | 14.7 | 69 | 20.4 | 5.2 | 6 |
| Nicaragua | – | – | – | – | 8.4 | 3.9 |
| Panama | 1.1 | 6 | 3.2 | 1.1 | 2.4 | 0.9 |
| Paraguay | 3.8 | 11.1 | 20.2 | 16.4 | 8.3 | 3.6 |
| Peru | 9.9 | 26.5 | 481.3 | 807.9 | 2.6 | 2.8 |
| Uruguay | 51.4 | 59.3 | 57.6 | 48.9 | 8.6 | 6.2 |
| Venezuela | 1 | 6.6 | 23 | 47.4 | 27.1 | 254.9 |
| Latin America | 3.2 | 11.3 | 10.6 | 10.6 | 4.7 | 2.3 |

Source: World Bank (2019).

# Money Supply and the Price Level: Argentina

▶ The relationship between the money supply and the price level conveyed in the equation of exchange seems to hold in the data:



Argentina
Money and Prices Growth Rates
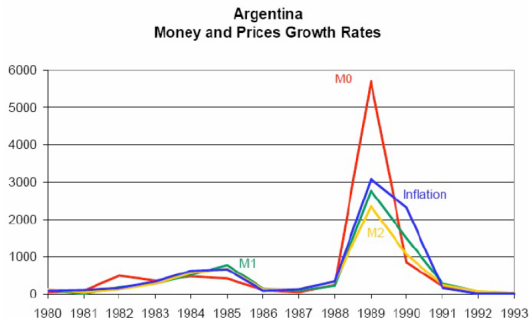
*M*0: Monetary base (Cash in hands of the public, plus bank reserves held by the central bank)
*M*1: *M*0, plus traveler's checks and demand deposits
*M*2: *M*1, plus money market shares and savings deposits

# Money Supply and the Price Level: Mexico

▶ The relationship between the money supply and the price level conveyed in the equation of exchange seems to hold in the data:



Mexico
Money and Prices Growth Rates
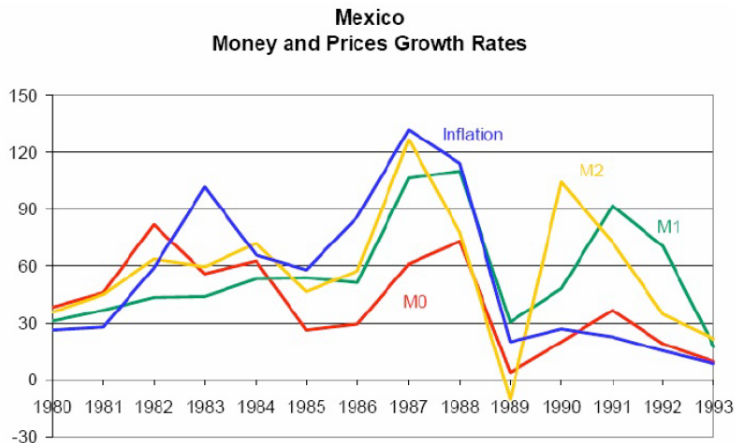
# Money Supply and the Price Level: Peru

▶ The relationship between the money supply and the price level conveyed in the equation of exchange seems to hold in the data:



Peru
Money and Prices Growth Rates
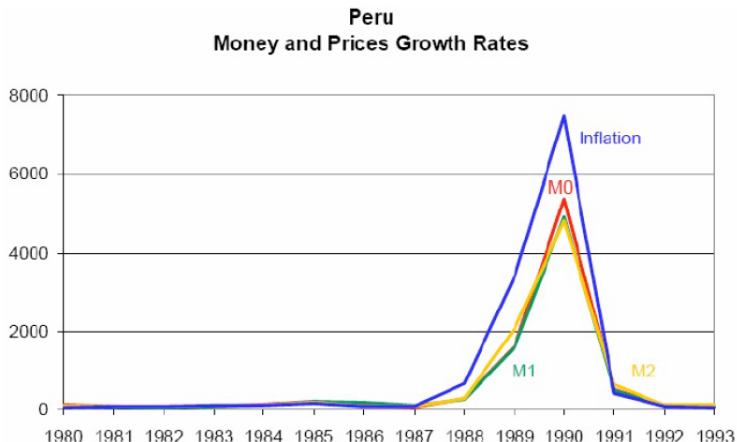
# The Inflationary Process

▶ **The equation of exchange is a useful device to think about the long-run effects of changes in the money supply.**

- In the long-run, changes in the money supply have no influence on the real-side of the economy (i.e., real GDP or employment).

  $\implies$ Money is "neutral".

▶ Since we're also interested in the short-run effects of changes in the money supply, we need a more flexible model.

- We need a model that does not only look at the supply of money, but also to its demand.

# Thank You!

# Kehoe and Nicolini's (2021) Book Back

▶ **Title**: *A Monetary and Fiscal History of Latin America, 1960–2017.*

▶ **Published by**: University of Minnesota Press.

▶ **Preliminary online version** (available for free): ▸ Click here!

▶ **Can order physical copy** ▸ here! ; $20 paperback and $80 hardcover.
  • 40% coupon code (MN88430) for November 2021 might still work.