# HE1002 Macroeconomics I

Final Practice Examination 4 – Solutions

Academic Year 2025/2026, Semester 1

*Quantitative Research Society @NTU*

November 14, 2025

## Question 1: Calculations – Complete Solutions (30 marks)

### 1.1 *[Source: T01-Q04]* – GDP Identity (2 marks)

**Given**: $C = 18.5$, $I = 4.2$, $G = 6.1$, $NX = -0.8$ (billions).

    **Formula**:
$$Y = C + I + G + NX$$

    **Solution**:
$$Y = 18.5 + 4.2 + 6.1 + (-0.8) = \boxed{\$28.0 \text{ billion}}$$

    *(Original Tutorial Question: Calculate GDP given C, I, G, NX with different numerical values)*

### 1.2 *[Source: T01-Q07]* – Expenditure Approach (2 marks)

**Given**: $C = 175{,}000$, $I = 60{,}000$, $G = 82{,}000$, $X = 38{,}000$, $M = 25{,}000$.

    **Formula**:
$$Y = C + I + G + (X - M)$$

    **Solution**:

$$NX = 38{,}000 - 25{,}000 = 13{,}000$$
$$Y = 175{,}000 + 60{,}000 + 82{,}000 + 13{,}000$$
$$= \boxed{\$330{,}000}$$

    *(Original Tutorial Question: Same calculation structure with different numerical values)*

## 1.3 *[Source: T02-Q03]* – CPI and Inflation (2 marks)

**Given**: $\text{Cost}_{2024} = \$25{,}000$, $\text{Cost}_{2025} = \$27{,}000$, Base $= 2024$.
    **Formulas**:

$$\text{CPI}_{2025} = \frac{\text{Cost}_{2025}}{\text{Cost}_{\text{base}}} \times 100$$

$$\pi = \frac{\text{CPI}_{2025} - \text{CPI}_{2024}}{\text{CPI}_{2024}} \times 100\%$$

**Solution**:
(a) CPI in 2025:

$$\text{CPI}_{2025} = \frac{27{,}000}{25{,}000} \times 100 = \boxed{108}$$

(b) Inflation rate:

$$\pi = \frac{108 - 100}{100} \times 100\% = \boxed{8\%}$$

*(Original Tutorial Question: Same methodology with different years and basket costs)*

## 1.4 *[Source: T03-Q02]* – Labor Market Statistics (2 marks)

**Given**: WAP $= 150{,}000$, LF $= 75{,}000$, Employed $= 60{,}000$.
    **Formulas**:

$$u = \frac{\text{Unemployed}}{\text{LF}} \times 100\%$$

$$\text{LFPR} = \frac{\text{LF}}{\text{WAP}} \times 100\%$$

**Solution**:
(a) Unemployment rate:

$$u = \frac{15{,}000}{75{,}000} \times 100\% = \boxed{20\%}$$

(b) Labor force participation rate:

$$\text{LFPR} = \frac{75{,}000}{150{,}000} \times 100\% = \boxed{50\%}$$

*(Original Tutorial Question: Same calculation structure with different population values)*

## 1.5 *[Source: T04-Q03]* – Rule of 70 (2 marks)

**Given**: $g = 4\%$ per year.
   **Formula**:
$$\text{Years to double} \approx \frac{70}{g}$$

   **Solution**:
$$t = \frac{70}{4} = \boxed{17.5 \text{ years}}$$

*(Original Tutorial Question: Same method with growth rate of 3.5%, yielding 20 years)*

## 1.6 *[Source: T04-Q01]* – Real GDP Per Capita Growth (2 marks)

**Given**: $g_{\text{Nominal}} = 9\%$, $\pi = 3.5\%$, $g_{\text{Pop}} = 1.2\%$.
   **Formula**:
$$g_{\text{GDP/cap}} \approx g_{\text{Nominal}} - \pi - g_{\text{Pop}}$$

   **Solution**:
$$g_{\text{GDP/cap}} = 9\% - 3.5\% - 1.2\% = \boxed{4.3\%}$$

*(Original Tutorial Question: Same decomposition with different growth rates)*

## 1.7 *[Source: T05-Q15]* – Multiplier Analysis (2 marks)

**Given**: MPC = 0.85, $\Delta A = \$600$M.
   **Formulas**:

$$m = \frac{1}{1 - \text{MPC}}$$
$$\Delta Y = m \times \Delta A$$

   **Solution**:
(a) Multiplier:
$$m = \frac{1}{1 - 0.85} = \frac{1}{0.15} = \boxed{6.67}$$

(b) Output change:
$$\Delta Y = 6.67 \times 600 = \boxed{\$4,000 \text{ million}}$$

*(Original Tutorial Question: Same calculation with MPC = 0.75, multiplier = 4)*

## 1.8 [Source: T05-Q12] – Equilibrium Output (2 marks)

**Given**: $C_0 = 900$, MPC $= 0.80$, $I = 1{,}200$, $G = 700$, $NX = 500$, $T = 600$.
   **Consumption function**:

$$C = C_0 + \text{MPC}(Y - T) = 900 + 0.80(Y - 600)$$

   **Equilibrium condition**:
$$Y = C + I + G + NX$$

   **Solution**:

$$Y = 900 + 0.80(Y - 600) + 1{,}200 + 700 + 500$$
$$Y = 900 + 0.80Y - 480 + 2{,}400$$
$$Y = 2{,}820 + 0.80Y$$
$$0.20Y = 2{,}820$$
$$Y^* = \boxed{\$14{,}100}$$

*(Original Tutorial Question: Same method with different parameter values)*

## 1.9 [Source: T07-Q10] – Fiscal Multipliers (2 marks)

**Given**: MPC $= 0.80$.
   **Formulas**:

$$m_G = \frac{1}{1 - \text{MPC}}$$
$$m_T = \frac{-\text{MPC}}{1 - \text{MPC}}$$

   **Solution**:
(a) Government spending multiplier:

$$m_G = \frac{1}{1 - 0.80} = \boxed{5}$$

(b) Tax multiplier:

$$m_T = \frac{-0.80}{1 - 0.80} = \boxed{-4}$$

   **Interpretation**: \$1 increase in $G$ raises output by \$5; \$1 tax increase reduces output by \$4.
   *(Original Tutorial Question: Same formulas with MPC = 0.75, yielding multipliers of 4 and -3)*

## 1.10 *[Source: T07-Q11]* – Budget Balance (2 marks)

**Given**: $G = \$400\text{B}$, $T = \$350\text{B}$.

    **Formula**:

$$\text{Budget Balance} = T - G$$

    **Solution**:

$$\text{Balance} = 350 - 400 = \boxed{-\$50 \text{ billion (deficit)}}$$

*(Original Tutorial Question: Same calculation with different spending and revenue values)*

## 1.11 *[Source: T08-Q19]* – Public and Private Saving (2 marks)

**Given**: $Y = 600$, $C = 420$, $G = 160$, $I = 100$, $T = 140$ (billions).

    **Formulas**:

$$\text{Public Saving} = T - G$$
$$\text{Private Saving} = Y - T - C$$

    **Solution**:
(a) Public saving:

$$S_{\text{public}} = 140 - 160 = \boxed{-\$20\text{B (deficit)}}$$

(b) Private saving:

$$S_{\text{private}} = 600 - 140 - 420 = \boxed{\$40\text{B}}$$

**Verification**: National saving $= S_{\text{public}} + S_{\text{private}} = -20 + 40 = 20\text{B}$, which should equal investment in closed economy. Since $NX = Y - C - I - G = 600 - 420 - 100 - 160 = -80\text{B}$ (actually open), investment is financed by saving plus capital inflows.

*(Original Tutorial Question: Same methodology with different GDP component values)*

## 1.12 *[Source: T09-Q07]* – Money Multiplier (2 marks)

**Given**: RR $= 0.125$, Deposit $= \$3{,}200$.

    **Formula**:

$$m_{\text{money}} = \frac{1}{\text{RR}}$$

    **Solution**:

$$m = \frac{1}{0.125} = 8$$
$$\text{Total Money} = 8 \times 3{,}200 = \boxed{\$25{,}600}$$

*(Original Tutorial Question: Same calculation with RR = 0.20, deposit = \$5,000, yielding \$25,000)*

## 1.13 *[Source: T10-Q16]* – Quantity Theory (2 marks)

**Given**: $g_M = 8.5\%$, $g_V = 0$, $g_Y = 2.5\%$.
**Formula**:

$$g_M + g_V = g_P + g_Y$$

**Solution**:

$$g_P = 8.5\% + 0\% - 2.5\% = \boxed{6\%}$$

*(Original Tutorial Question: Same method with different growth rates)*

## 1.14 *[Source: T12-Q01]* – Balance of Trade (2 marks)

**Given**: Exports = \$280B, Imports = \$360B.
**Formula**:

$$NX = X - M$$

**Solution**:

$$NX = 280 - 360 = \boxed{-\$80 \text{ billion (trade deficit)}}$$

*(Original Tutorial Question: Same calculation with different export/import values)*

## 1.15 *[Source: T12-Q18]* – Purchasing Power Parity (2 marks)

**Given**: Price in France = €4.80, Price in US = US\$4.50, Actual rate = US\$1.10/€.
**Formula**:

$$\text{PPP exchange rate} = \frac{\text{Price}_{\text{domestic}}}{\text{Price}_{\text{foreign}}}$$

**Solution**:
(a) PPP-implied exchange rate:

$$e_{\text{PPP}} = \frac{4.50}{4.80} = \boxed{\text{US\$0.9375 per €}}$$

(b) Valuation:
Actual rate (US\$1.10/€) ¿ PPP rate (US\$0.9375/€), so $\boxed{\text{euro is overvalued}}$.
**Reasoning**: Dollar buys fewer euros than PPP suggests, meaning euros are expensive.
*(Original Tutorial Question: Same PPP methodology with different Big Mac prices and countries)*

# Question 2: Short Answer – Complete Solutions (30 marks)

## 2.1 *[Source: T01-Q03]* – Education Grants and GDP (3 marks)

**Answer**:

Government grants to students are transfer payments, not purchases of goods and services, so they do **not** count directly in GDP under government spending ($G$). However, when students use grants to pay tuition, the educational services provided by universities count as consumption ($C$) if the student purchases them. Only actual production of goods and services enters GDP—transfers merely redistribute income. If the grant is spent on textbooks, that consumption of goods counts; the grant itself does not.

*(Original Tutorial Question: Asked about general transfer payments; adapted to education grant context)*

## 2.2 *[Source: T02-Q05]* – Hedonic Adjustment for Smartphones (3 marks)

**Answer**:

Smartphone prices require hedonic adjustment because quality improves dramatically over time—each generation offers better cameras, faster processors, more storage, and new features. Without adjustment, CPI would overstate inflation: a 2025 phone priced at $800 is not directly comparable to a 2020 phone at $600 because the 2025 version has far superior capabilities. Hedonic methods isolate the price change due to inflation from the component reflecting quality improvements, ensuring CPI measures cost of living rather than cost of better products.

*(Original Tutorial Question: Asked about laptop computers; adapted to smartphones)*

## 2.3 *[Source: T03-Q07]* – Cyclical vs Structural Unemployment (3 marks)

**Answer**:

**Cyclical unemployment** arises from insufficient aggregate demand during recessions—workers lose jobs because firms cut production when sales fall. Example: auto workers laid off during 2008 recession due to plummeting car sales. **Structural unemployment** results from mismatch between worker skills and job requirements, or geographic/occupational barriers. Example: coal miners unemployed because mines close permanently due to shift toward renewable energy. Cyclical unemployment disappears when economy recovers; structural unemployment persists even at full employment without retraining or relocation.

*(Original Tutorial Question: Same distinction; adapted examples)*

## 2.4 *[Source: T04-Q04]* – Medical Technology and Productivity (3 marks)

**Answer**:

The breakthrough drug improves **total factor productivity (TFP)**—it represents technological progress that increases output without additional capital or labor inputs. Workers stay healthier and more productive; healthcare resources treat more patients with same inputs. TFP growth is the primary driver of long-run economic growth because it doesn't face diminishing returns like capital accumulation. Medical innovations raise potential output, enabling sustained increases in living standards. This differs from human capital (education) which improves labor quality, or physical capital (equipment) which augments production capacity.

*(Original Tutorial Question: Asked about generic technology; adapted to medical innovation context)*

## 2.5 *[Source: T05-Q03]* – Tax Cut vs Government Purchase Multipliers (3 marks)

**Answer**:

Tax cuts have smaller multipliers because only a fraction (MPC) of the tax cut gets spent immediately—households save the rest. If MPC = 0.80, a \$1 tax cut generates only \$0.80 initial spending. In contrast, \$1 of government purchases directly adds \$1 to aggregate demand. The multipliers reflect this: $m_G = 1/(1 - \text{MPC}) = 5$, while $m_T = -\text{MPC}/(1 - \text{MPC}) = -4$. First-round spending is larger for government purchases, creating stronger subsequent rounds through the multiplier process, making government spending more effective per dollar.

*(Original Tutorial Question: Compared multiplier magnitudes; adapted to explain mechanism)*

## 2.6 *[Source: T06-Q08]* – SRAS vs LRAS Slopes (3 marks)

**Answer**:

The short-run aggregate supply (SRAS) curve has a **positive slope** because wages and prices are sticky—when price level rises, firms' revenues increase but costs (wages) don't adjust immediately, making production more profitable and incentivizing increased output. The long-run aggregate supply (LRAS) curve is **vertical** because in the long run, all prices and wages fully adjust proportionally to price level changes, leaving real wages unchanged and output determined solely by real factors (capital, labor, technology). SRAS captures temporary price-cost mismatches; LRAS reflects full price flexibility.

*(Original Tutorial Question: Asked about difference; adapted to focus on slope explanations)*

## 2.7 *[Source: T07-Q08]* – Automatic Stabilizer Mechanism (3 marks)

**Answer**:

Automatic stabilizers reduce fluctuations through **countercyclical passive adjustment**. With progressive taxation, when recession reduces incomes, tax payments fall automatically (moving to lower brackets), leaving households with more disposable income than if taxes were fixed. This cushions the consumption drop. Conversely, during booms, tax payments rise (moving to higher brackets), automatically removing purchasing power and cooling overheating. The mechanism operates without legislative action—the tax *structure* itself stabilizes by making after-tax income less volatile than before-tax income, dampening both recessions and expansions through the multiplier.

*(Original Tutorial Question: Listed examples; adapted to explain mechanism)*

## 2.8 *[Source: T08-Q04]* – Saving (Flow) vs Wealth (Stock) (3 marks)

**Answer**:

**Saving** is a **flow variable**—measured per unit of time (e.g., $10,000 per year). It represents the rate at which income exceeds consumption. **Wealth** is a **stock variable**—measured at a point in time (e.g., $500,000 on Jan 1, 2025). It represents accumulated assets minus liabilities. Relationship: saving is the flow that increases the stock of wealth. If you save $10,000 this year, your wealth increases by $10,000 (plus investment returns). Analogy: saving is like water flowing into a bathtub; wealth is the water level.

*(Original Tutorial Question: Compared saving vs investment; adapted to stock-flow distinction)*

## 2.9 *[Source: T09-Q01]* – Ranking Money Functions (3 marks)

**Answer**:

Ranking by importance for modern economies: (1) **Medium of exchange**—most critical because it eliminates barter's double coincidence problem, enabling specialization and trade efficiency; (2) **Unit of account**—essential for price comparisons and economic calculation but could function with instability; (3) **Store of value**—least critical because other assets (bonds, real estate) store value better, and inflation erodes money's value. Without medium of exchange function, modern complex economies couldn't function. Hyperinflation destroys store of value but economies continue operating; loss of medium of exchange causes economic collapse.

*(Original Tutorial Question: Listed three functions; adapted to require ranking and justification)*

## 2.10 *[Source: T10-Q12]* – Money Neutrality (3 marks)

**Answer**:

Money neutrality means that in the long run, changes in money supply affect only nominal variables (price level, nominal wages) but not real variables (output, employment, real wages). Doubling money supply eventually doubles all prices and wages proportionally, leaving real economy unchanged. **Policy implication**: Monetary policy cannot permanently increase output or reduce unemployment below natural rates—it only determines inflation rate. Central banks should focus on price stability rather than attempting to permanently boost employment. This explains why inflationary policies don't create lasting prosperity, only higher prices.

*(Original Tutorial Question: Defined neutrality; adapted to require policy implication)*

# Question 3: True or False – Complete Solutions (30 marks)

## 3.1 *[Source: T01-Q17]* – Home Production and GDP (3 marks)

**Statement**: A parent who quits a paid job to stay home and care for their child does not cause GDP to change, because the same childcare service is being provided.

   **Answer**: **FALSE**

   **Explanation**: GDP *falls* when the parent quits because GDP only counts market transactions. Previously, the parent's paid work generated measured income and output (counted in GDP). Although the parent still provides childcare at home, this non-market production is not included in GDP. Even though the same (or better) childcare service is provided, GDP decreases because the market transaction disappears. This illustrates a fundamental GDP limitation—it doesn't capture non-market production like household work, even though such production has real economic value.

   *(Original Tutorial Question: TRUE statement about home production not counting; reversed polarity to test understanding)*

## 3.2 *[Source: T03-Q01c]* – Labor Force Classification (3 marks)

**Statement**: A worker who is actively seeking employment but hasn't found a job yet is classified as "not in the labor force" by the Bureau of Labor Statistics.

   **Answer**: **FALSE**

   **Explanation**: A worker actively seeking employment is classified as **unemployed**, which means they *are* in the labor force. The labor force consists of employed plus unemployed workers. "Not in labor force" applies only to those neither working nor looking for work (students, retirees, discouraged workers). The key criterion is active job search—as long as someone is looking, they count as labor force participants, even if unemployed. This distinction matters for unemployment rate calculation: $u = $ Unemployed/Labor Force.

   *(Original Tutorial Question: Defined discouraged workers as not in labor force (TRUE); reversed to test unemployed classification)*

## 3.3 *[Source: T04-Q08a]* – Labor Share and Growth (3 marks)

**Statement**: Country A's labor share is 65%, Country B's labor share is 55%, and labor is growing at 3% in both countries. All else equal, Country A has a higher growth rate of output than Country B.

   **Answer**: **TRUE**

   **Explanation**: Growth accounting equation: $g_Y = g_A + \alpha g_K + (1 - \alpha)g_L$, where $(1 - \alpha)$ is labor's share. Country A has labor share of 65%, so labor growth contributes $0.65 \times 3\% = 1.95\%$ to output growth. Country B has labor share of 55%, contributing $0.55 \times 3\% = 1.65\%$. With identical capital growth, TFP growth, and labor growth rates, Country A grows 0.3 percentage points faster annually due to higher labor share magnifying labor's

growth contribution. Higher labor share means output is more sensitive to labor input changes.

*(Original Tutorial Question: Compared labor vs capital contributions; adapted to test share effects)*

## 3.4 *[Source: T05-Q02]* – Investment vs Consumption Volatility (3 marks)

**Statement**: Consumption spending is more volatile than investment spending over the business cycle.

**Answer**: **FALSE**

**Explanation**: Investment is far more volatile than consumption. Data show investment falls sharply during recessions (often 20-30% declines) while consumption drops modestly (typically 2-5%). Reasons: (1) Investment depends on expected future profitability, making it highly sensitive to expectations; (2) Durable goods purchases (investment component) are easily postponed; (3) Consumption includes non-discretionary spending (food, housing) that remains stable. The permanent income hypothesis suggests households smooth consumption, while accelerator theory explains investment's sensitivity to output changes. This volatility makes investment the primary driver of business cycle fluctuations.

*(Original Tutorial Question: Stated investment more volatile (TRUE); reversed polarity)*

## 3.5 *[Source: T06-Q02]* – Tax Changes and AD (3 marks)

**Statement**: A tax increase that decreases disposable income will shift the aggregate demand curve to the left.

**Answer**: **TRUE**

**Explanation**: Higher taxes reduce disposable income $(Y - T)$, causing consumption to fall by $\text{MPC} \times \Delta T$. Lower consumption shifts the aggregate demand curve leftward: $AD = C + I + G + NX$ decreases when $C$ falls. The leftward shift equals $\Delta T \times m_T = \Delta T \times [-\text{MPC}/(1 - \text{MPC})]$, where the tax multiplier is negative. For example, if MPC = 0.75 and taxes rise \$100B, consumption falls \$75B initially, then multiplier amplifies to \$300B total AD reduction. This contractionary fiscal policy reduces equilibrium output and price level.

*(Original Tutorial Question: Asked about tax cuts increasing AD (TRUE); reversed to test tax increase effects)*

## 3.6 *[Source: T07-Q09]* – Ricardian Equivalence Validity (3 marks)

**Statement**: Ricardian equivalence holds in reality for most consumers, meaning debt-financed tax cuts have almost no effect on consumption.

**Answer**: **FALSE**

**Explanation**: Ricardian equivalence generally fails in practice due to several violations of its strict assumptions: (1) **Credit constraints**—many households cannot borrow freely,

so tax cuts provide liquidity they otherwise lack; (2) **Myopia**—consumers don't perfectly foresee future tax liabilities decades ahead; (3) **Finite horizons**—older individuals may die before higher future taxes occur, making current tax cuts free wealth. Empirical evidence shows debt-financed tax cuts do significantly boost consumption, though less than Keynesian theory predicts. Ricardian equivalence is a theoretical benchmark, not a realistic description.

*(Original Tutorial Question: Defined Ricardian equivalence; adapted to test whether it holds practically)*

## 3.7 *[Source: T08-Q17]* – Market Efficiency with Frictions (3 marks)

**Statement**: If financial markets have significant information asymmetries and transaction costs, skilled investors can consistently earn above-average returns through careful research and analysis.

   **Answer**: **TRUE**

   **Explanation**: Market efficiency requires perfect information and zero transaction costs. When these fail, skilled analysis can exploit mispricings. Information asymmetries create opportunities for informed traders to profit from superior knowledge. Transaction costs prevent arbitrageurs from eliminating small mispricings. However, "consistently" is qualified—earning above-average returns after adjusting for risk is difficult even with skill. Markets may be "semi-strong efficient" (public info incorporated) but not "strong-form efficient" (all info incorporated). Real-world evidence shows some professional investors (e.g., Warren Buffett) outperform over decades, suggesting exploitable inefficiencies exist.

   *(Original Tutorial Question: Stated efficient markets prevent above-average returns (TRUE); reversed to test inefficiency effects)*

## 3.8 *[Source: T09-Q06]* – M1 vs M2 Velocity (3 marks)

**Statement**: M1 has a higher velocity of money than M2 because M1 includes more liquid assets that turn over more frequently.

   **Answer**: **TRUE**

   **Explanation**: Velocity measures how often money changes hands: $V = PY/M$. M1 (currency, checking accounts) consists of transaction media used for daily purchases, turning over frequently. M2 includes M1 plus savings accounts and small time deposits, which are held longer and transact less frequently. Since M2 is larger denominator with same numerator (nominal GDP), $V_{M1} > V_{M2}$. Empirically, M1 velocity is roughly 6-7, while M2 velocity is 1.5-2. Liquidity correlates with velocity—more liquid assets circulate faster through the economy.

   *(Original Tutorial Question: Defined M1 vs M2 composition; adapted to test velocity relationship)*

## 3.9 *[Source: T10-Q22]* – Fully Anticipated Inflation (3 marks)

**Statement**: If workers and firms fully anticipate inflation, the short-run Phillips curve becomes vertical like the long-run Phillips curve.

**Answer**: **TRUE**

**Explanation**: The short-run Phillips curve slopes downward only when inflation differs from expectations. If everyone perfectly anticipates inflation, there are no surprises to affect real wages or employment. The Phillips curve equation $\pi = \pi^e - \beta(u - u_n)$ becomes vertical when $\pi = \pi^e$ always holds—any attempt to reduce unemployment just raises inflation expectations immediately, preventing real effects. This converges SRPC to LRPC. The distinction between SR and LR Phillips curves relies on sticky expectations; perfect foresight eliminates this stickiness, making monetary policy impotent even in short run.

*(Original Tutorial Question: Asked about SRPC vs LRPC slopes generally; adapted to test expectations role)*

## 3.10 *[Source: T12-Q17]* – Fiscal Policy and Exchange Regimes (3 marks)

**Statement**: Fiscal policy is more effective under a floating exchange rate regime than under a fixed exchange rate regime.

**Answer**: **FALSE**

**Explanation**: Fiscal policy is actually **more effective under fixed rates**. Under floating rates, expansionary fiscal policy raises interest rates, attracting capital inflows and appreciating the currency. Appreciation reduces net exports, partially offsetting fiscal stimulus (crowding out via trade channel). Under fixed rates, the central bank must expand money supply to maintain the peg when fiscal expansion increases money demand, reinforcing the stimulus. The opposite holds for monetary policy: effective under floating, impotent under fixed. This is the Mundell-Fleming trilemma—a country cannot simultaneously maintain fixed exchange rates, free capital flows, and independent fiscal policy.

*(Original Tutorial Question: Asked about monetary policy effectiveness (TRUE); adapted to test fiscal policy instead)*

# Question 4: Diagrams – Complete Solutions (10 marks)

## 4.1 *[Source: T06-Q17]* – Positive Demand Shock (5 marks)

**Scenario**: Infrastructure spending creates positive demand shock.
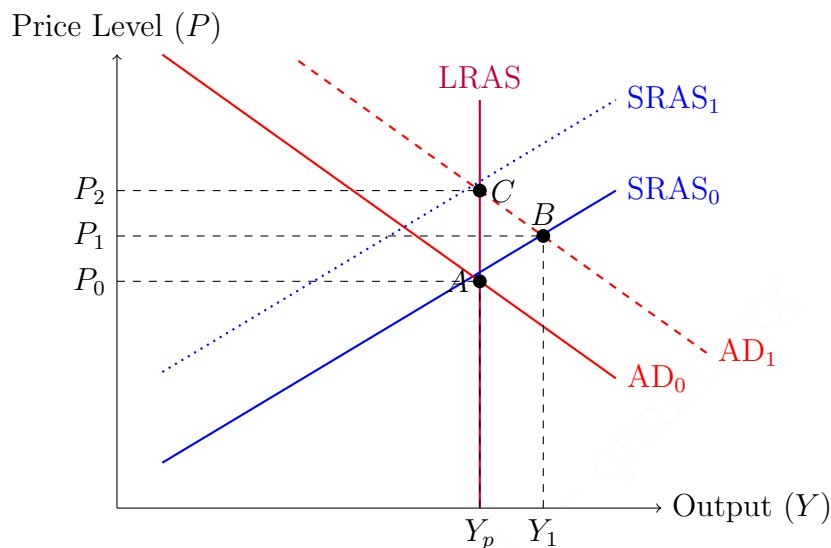


**Analysis**:

(a-b) **Initial equilibrium at A**: Economy at potential $Y_p$, price $P_0$. Fiscal expansion (infrastructure spending) shifts AD right from $AD_0$ to $AD_1$.

(c) **Short-run effects (point B)**:

- Output rises from $Y_p$ to $Y_1$ (boom)
- Price level increases from $P_0$ to $P_1$
- Unemployment falls below natural rate
- Economy operating above capacity

(d) **Long-run self-correction (A → B → C)**:

With output above potential and unemployment below natural rate, labor markets tighten. Workers demand higher wages to match higher price level. As nominal wages rise, production costs increase, shifting SRAS left from $SRAS_0$ to $SRAS_1$. Economy moves from B to C.

**Final long-run equilibrium at C**:

- Output returns to $Y_p$ (potential)
- Price level higher at $P_2$
- No permanent output gain—only inflation

**Policy lesson**: Demand-side policies cannot permanently push output above potential. Long-run effect is purely inflationary.

*(Original Tutorial Question: Analyzed negative demand shock (recession); reversed to positive shock with fiscal policy)*

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## 4.2 [Source: T08-Q06, Q21] – Investment Demand Increase (5 marks)

**Scenario**: Technological innovation shifts investment demand right.

Interest Rate $(r)$



Quantity of Loanable Funds
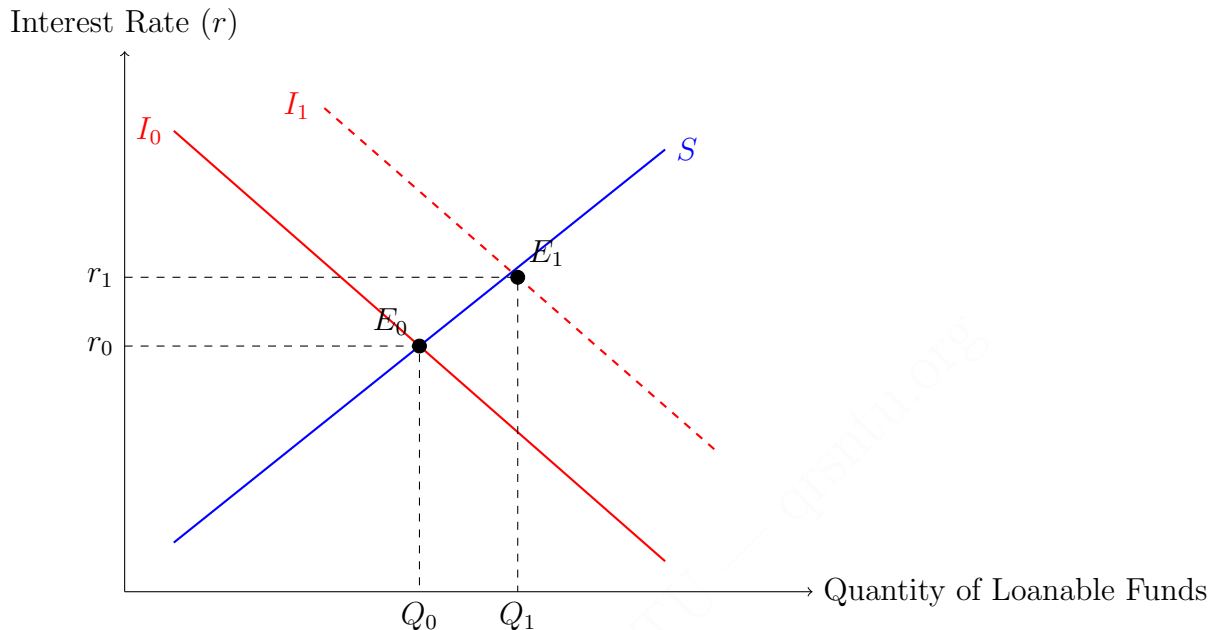
**Analysis**:

(a) **Initial equilibrium** $E_0$: Supply intersects demand at $r_0$, quantity $Q_0$.

(b) **Investment shift**: Tech innovation increases expected returns, shifting investment demand right from $I_0$ to $I_1$.

(c) **New equilibrium** $E_1$:

- Interest rate rises from $r_0$ to $r_1$
- Quantity of loanable funds increases from $Q_0$ to $Q_1$
- Both saving and investment higher

(d) **Comparison with government borrowing**:

**Key difference**: When private investment demand increases, there is **NO crowding out**. Both private investment and total funds increase.

When government borrowing increases demand instead:

- Demand shifts right similarly
- Interest rate rises
- BUT private investment falls (crowding out)
- Government absorbs funds that would finance private investment

**Why the difference?**

- **Investment shift**: Firms want to invest more at any interest rate due to higher expected returns. Rising rates don't deter investment as much because profitability increased.

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- **Government shift**: Adds new demand without changing private investment incentives. Rising rates reduce private investment along the original curve.

**Economic interpretation**: Investment-driven interest rate increases reflect productive opportunities (economy's ability to absorb funds improved). Government-driven increases reflect competition for fixed saving (crowding out productive investment).

*(Original Tutorial Question: Analyzed government deficit crowding out; reversed to investment increase scenario)*

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**END OF SOLUTIONS**

All solutions include original tutorial question references
Complete working shown with economic interpretations

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