ChatGPT

Fiscal and Monetary Policy in the IS–LM Framework

The IS–LM model captures equilibrium in the goods market (IS curve) and money market (LM curve). Fiscal policy (changes in government spending *G* or taxes *T*) shifts the **IS curve**, while monetary policy (changes in the money supply *M*) shifts the **LM curve**. Critically, the *slope* of each curve depends on interest-sensitivity: investment's response to *r* affects the IS slope, and money demand's response to *r* affects the LM slope [1] [2]. We distinguish cases by whether these curves are **vertical** or **sloped**:

- **Vertical IS (investment insensitive to *r*):** Here $I = I(Y)$ (no *r*-term). For example, the slides use $C = 5 + 0.2(Y–T)$ and $I = 3 + 0.4Y$ (no *r* term) [3]. This "classical" assumption means output *Y* is fixed by demand; changes in *r* do not alter *I*. Graphically, IS is vertical [1]. **Implications:** An expansionary **fiscal** policy (↑G) shifts IS right and raises *Y* fully, since investment does not fall (no crowding out) [4]. In contrast, an expansionary **monetary** policy (↑M, shifting LM right) lowers *r* but leaves *Y* unchanged [1]. In short, **vertical IS ⇒ fiscal policy works, monetary policy does not** [5] [4].

- **Downward-sloping IS (investment sensitive to *r*):** Here $I = I(Y, r)$ with a negative *r* term (e.g. $I = 3 + 0.4Y – 200r$ [3]). The IS curve slopes downwards (higher *r* reduces *I*). **Implications:** Monetary expansion lowers *r*, which stimulates *I* and thus raises *Y*. Fiscal expansion still raises *Y* but partly crowds out investment (since *r* rises) [4]. Thus **sloped IS ⇒ monetary policy is effective; fiscal policy faces some crowding-out**. (Slides conclude that "when investment is less sensitive to *r*, monetary policy is less effective" [5]; conversely, if investment *is* sensitive, monetary policy is strong.)

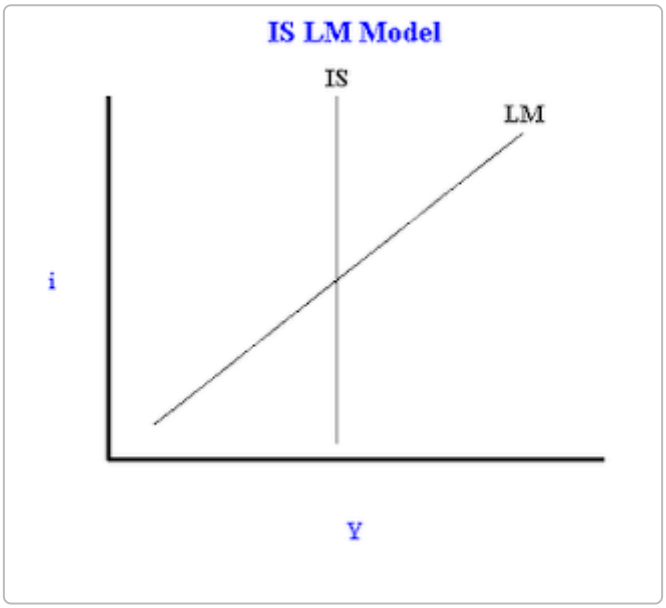

Figure 1: IS–LM with a vertical IS (grey) and an upward-sloping LM (black). A vertical IS (investment insensitive to r*) means monetary policy (shifting LM) changes the interest rate without changing output* [1] *, while fiscal policy shifts output fully (no crowding out)* [4] *.*

- **Vertical LM (money demand insensitive to *r*):** When money demand *Md* depends only on income (and not on *r*), the LM curve is vertical [2] . The slides describe this as occurring at very high interest rates (speculative demand ≈0) [6] . In this case, monetary injections have a large effect: increasing *M* must translate into higher *Y* (since *r* cannot equilibrate money demand), so monetary policy dramatically lowers *r* and raises *Y* [7] . Fiscal policy, however, simply drives *r* higher without changing *Y*: a rightward IS shift raises income demand for transactions money, which (on a vertical LM) forces *r* up sharply and fully crowds out *I*, leaving *Y* unchanged [6] [8] .

- **Upward-sloping LM (money demand sensitive to *r*):** At low or moderate interest rates, people hold both cash and bonds, so *Md = kY – h r* (e.g. *Md = 5Y – 200r* from the slides) and LM slopes upward [9] . Here, **fiscal policy** shifts IS to the right, raising *Y* and *r* (partial crowding out) [10] . **Monetary policy** shifts LM right, lowering *r* and raising *Y* by a smaller amount (since *r* only falls moderately). In summary, a sloped LM means both policies change *Y*, but crowding-out is only partial.

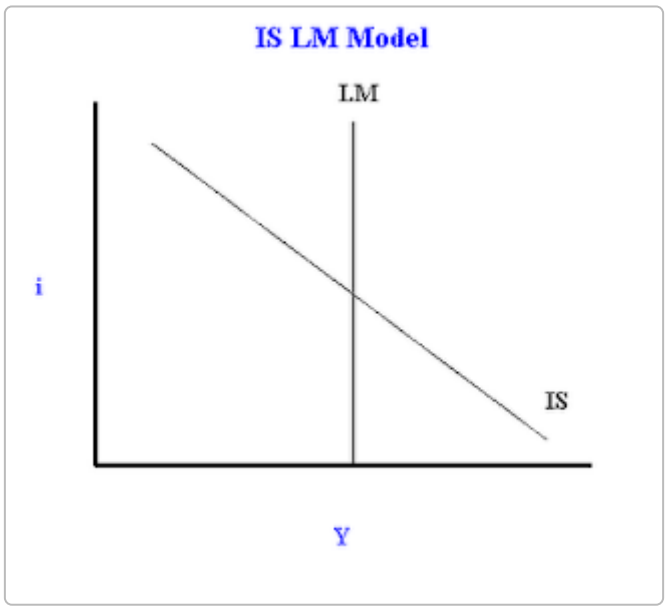

Figure 2: IS–LM with a vertical LM (grey) and a downward-sloping IS (black). A vertical LM (money demand insensitive to r*) implies fiscal shifts IS change only* r*, not* Y [6] [8] *, whereas a shift in LM has a large impact on* Y *(monetary expansion greatly lowers* r *and raises* Y*)* [7] *.*

Summary of Policy Effects

Combining these cases:

- **Vertical IS, Sloped LM:** Fiscal ↑G ⇒ *Y* rises strongly (no crowding) [4] . Monetary ↑M ⇒ *r* falls but *Y* unchanged.
- **Sloped IS, Sloped LM:** Fiscal ↑G ⇒ *Y* up, *r* up, some *I* crowding [4] [10] . Monetary ↑M ⇒ *r* down, *I* and *Y* up moderately.
- **Sloped IS, Vertical LM:** Fiscal ↑G ⇒ *r* jumps, *Y* unchanged (full crowding) [6] . Monetary ↑M ⇒ *r* falls sharply, *I* and *Y* rise strongly [7] .

- **Vertical IS, Vertical LM:** Fiscal ↑G ⇒ *Y* up (no crowding) [4]. Monetary ↑M ⇒ *Y* up strongly (large fall in *r*) [7].

The key insight is that **interest-sensitivity assumptions matter**. Classical/monetarist models often assume low sensitivity of both investment and money demand (vertical IS and LM), so money supply dominates and fiscal crowding-out is full [5] [11]. In Keynesian views, especially at low interest rates, money demand is sensitive and investment is responsive to *r*, yielding sloped curves and strong fiscal effects [11] [12].

Overall, *if investment is insensitive to r, fiscal policy is most potent (monetary ineffective)* [5] [4]; *if money demand is insensitive to r, monetary policy is most potent (fiscal ineffective)* [6] [7]. These conclusions use the slide assumptions (e.g. *C = 5 + 0.2(Y–T)*, *I = 3 + 0.4Y –200r*, *Md = 5Y –200r* etc. as given) [3] [9].

Practice Questions

Multiple-Choice Questions

1. **Which assumption yields a vertical IS curve?**
   A. Investment depends only on income *Y* (not on interest)
   B. Investment depends only on interest *r* (not on income)
   C. Money demand is insensitive to *r*
   D. Consumption is constant
   (Answer: A; vertical IS arises when I = I(Y) *with no* r*-term* [1]*.)*

2. **In the IS–LM model, an expansionary monetary policy (↑M) is** least effective **at raising output when:**
   A. The IS curve is vertical
   B. The LM curve is vertical
   C. The IS curve is downward-sloping
   D. The LM curve is upward-sloping
   (Answer: A; with a vertical IS, shifting LM changes r *but does not affect* Y [1]*.)*

3. **If money demand is completely insensitive to the interest rate (vertical LM), what is the effect of a fiscal expansion?**
   A. Large increase in *Y*, little change in *r*
   B. No change in *Y*, large increase in *r*
   C. Large decrease in *Y*, small decrease in *r*
   D. No change in *r*, large increase in *Y*
   (Answer: B; vertical LM means fiscal shifts IS raise only r*, with full crowding out (no* Y *gain)* [6]*.)*

4. **According to the slides, when is monetary policy** most effective**?**
   A. When investment is highly sensitive to *r*
   B. When money demand is insensitive to *r*
   C. When the IS curve is downward-sloping
   D. When consumption is insensitive to income
   (Answer: B; monetary policy is strongest when LM is vertical (money demand insensitive to r*), since money injections greatly boost* Y [7] [6]*.)*

5. **In a Keynesian view with low interest rates, money demand tends to be interest-sensitive. What does this imply for fiscal policy?**
   A. Fiscal policy is ineffective (complete crowding out)

B. Fiscal policy is highly effective at changing *Y*
C. Monetary policy is rendered ineffective
D. Fiscal policy shifts the LM curve
(Answer: B; interest-sensitive money demand (sloped LM) makes fiscal expansion effective at raising Y *(partial crowding)* [11] [10] *.)*

6. **The slides give *I = 3 + 0.4Y – 200r*. If the coefficient on *r* (–200) were zero instead, what would change?**
   A. The IS curve would become horizontal
   B. The IS curve would become vertical
   C. The LM curve would become vertical
   D. Fiscal policy would have no effect on *Y*
   (Answer: B; if the –200r term is removed, I *no longer depends on* r*, making IS vertical* [1] *.)*

7. **Empirically, the slides note that Indian investment and consumption grew despite rising interest rates. This suggests that:**
   A. Money demand is highly interest-sensitive
   B. Investment is highly interest-sensitive
   C. Both *I* and *C* depend more on *Y* than on *r*
   D. LM is horizontal
   (Answer: C; the data imply I *and* C *respond more to income than to* r*, consistent with a steeper IS* [13] *.)*

8. **Which policy is likely to fully crowd out private investment?**
   A. Fiscal expansion when LM is vertical
   B. Monetary expansion when IS is vertical
   C. Fiscal expansion when IS is vertical
   D. Monetary expansion when LM is vertical
   (Answer: A; vertical LM means fiscal expansion raises r *intensely, fully crowding out* I [6] *.)*

9. **If an economy is at a very low interest rate where money demand is highly interest-sensitive, the LM curve is relatively flat. In this case:**
   A. Fiscal policy is extremely powerful (no crowding out)
   B. Monetary policy has no effect on output
   C. Fiscal expansion raises output a lot (no change in *r*)
   D. Monetary expansion may have limited effect on output
   (Answer: D; a flat LM (horizontal) means money demand depends strongly on r*, so increasing* M *mainly lowers* r *with little* Y *change. Fiscal is then very effective. Note: slides emphasize low-*r ⇒ *sloped LM ⇒ fiscal effective, monetary weaker* [11] *.)*

10. **In "Economy B" of the freeeconhelp example, investment does not depend on *i*. What do they conclude about policy?**
    A. Fiscal policy has no effect on *Y* (ineffective)
    B. Monetary policy fully changes *Y* (effective)
    C. Fiscal policy fully changes *Y* (effective); monetary policy cannot change *Y*
    D. Both fiscal and monetary policies are ineffective
    (Answer: C; vertical IS ⇒ full effect of fiscal, but monetary moves only i [1] [14] *.)*

Long-Answer Questions

1. **(Analysis)** *Compare the effects of an expansionary monetary policy (↑ M) in two economies: one with a vertical IS curve and one with a downward-sloping IS curve. Use IS–LM analysis to explain the difference.*

Answer: In an economy with a **vertical IS curve** (investment **insensitive** to *r*), the IS curve is fixed at a given *Y*. An increase in the money supply shifts LM right, but since IS is vertical, the new intersection moves along IS without changing *Y*. The effect is a **fall in r only** [1]. Thus output stays the same. In contrast, with a **downward-sloping IS** (investment **sensitive** to *r*), raising *M* shifts LM right, lowering *r*, which stimulates investment. The IS curve then shifts (through higher *Y*), yielding **higher Y and lower r**. In summary, with vertical IS, monetary policy is essentially **ineffective for output**, but with sloped IS it is effective.

1. **(Synthesis)** *Explain how the assumption of money demand being interest-insensitive (vertical LM) leads to the conclusion that fiscal policy is ineffective. Use the mechanisms of crowding out in your explanation.*

Answer: Interest-insensitive money demand means the **LM curve is vertical**, usually at high *r* when people hold only bonds. A fiscal expansion (↑ G) shifts IS right, raising demand. On a vertical LM, this extra demand translates into a sharp rise in *r* (because money demand doesn't allow *r* to adjust much). As *r* spikes, investment falls strongly. In the extreme (pure vertical LM), the rise in *r* fully crowds out private investment, leaving output *Y* **unchanged** [6] [8]. Thus fiscal policy, which shifts IS, ends up only moving *r* (not *Y*) and is ineffective for stimulating output.

1. **(Evaluation)** *The slides claim "monetarists propagate monetary policy as a powerful instrument" but also that "fiscal policy is more effective when investment is interest-insensitive." Reconcile these statements in terms of underlying assumptions.*

Answer: The apparent conflict arises from different assumptions. Monetarists typically assume **money demand is interest-insensitive** (vertical LM) but also **investment is not very sensitive to *r*** (vertical-ish IS). In that case, monetary expansions produce large output changes (vertical LM means big *Y* effect) while fiscal expansions are partly or fully crowded out [6] [7]. On the other hand, if investment is assumed interest-insensitive (vertical IS), fiscal shifts IS strongly affect *Y* (no crowding) [4], but a vertical IS means monetary shifts do nothing. The key is that *if* one assumes vertical LM (monetarist view), then monetary policy is seen as powerful. *If* one assumes vertical IS (classical view), fiscal policy is powerful. Monetarists favor the first scenario, Keynesians the second.

1. **(Application)** *Given the following functions from the slides: C = 5 + 0.2(Y–T), I = 3 + 0.4Y (no r term), and Md = 5Y – 200r (normal LM). Suppose T and G are such that initially Y = 100 and r = 5%. If G increases by 10 (with T constant), estimate qualitatively how Y and r change.*

Answer: Here investment has **no r-term** so IS is vertical. An increase ΔG = +10 shifts IS right. On the sloped LM, the new equilibrium must satisfy money market: M/P = 5Y – 200r. Since the slides assume vertical IS, the initial *Y* will rise by the full multiplier (1/(1–0.2–0.4)=1/0.4=2.5 in a simplistic model), so ΔY ≈ +25 in goods market if nothing else changed. But the *strict* vertical IS assumption implies **no crowding out**, so *Y* effectively rises by that full amount. Meanwhile, higher *Y* raises money demand (5ΔY = 5*25 = 125). *To maintain equilibrium in money market (with fixed M),* r *must increase. In fact, the slide narrative says interest rises but investment hardly falls (no crowding out). Qualitatively: Y rises substantially*

(perhaps toward 125), and r also rises by whatever amount clears money market. The key is Y *rises significantly;* r* jumps, but investment does not fall enough to offset Y.

1. **(Analysis)** *Describe graphically and verbally how an expansionary monetary policy works in an economy where the IS curve is sloped but the LM curve is very flat (nearly horizontal). What are the effects on Y and r?*

Answer: A very flat (nearly horizontal) LM means money demand is highly interest-sensitive (common at very low *r*). Starting at equilibrium, an upward shift in LM (via ↑M) barely changes interest (it was already low) but cannot increase *Y* much because even a slight movement down along a flat LM demands a large M change. Graphically, the LM shift intersects the sloped IS at nearly the same *Y*, causing only a **small increase in output** and a **slight fall in r**. In effect, monetary policy is **weak**: *r* was already low so injecting money mostly just lowers *r* further slightly, with little additional investment or output. (This is analogous to a liquidity-trap scenario.)

---

1 2 8 12 14 Horizontal and vertical IS and LM curves, an intuitive explanation of the implications - FreeEconHelp.com, Learning Economics... Solved!
https://www.freeeconhelp.com/2012/04/horizontal-and-vertical-is-and-lm.html

3 4 5 6 7 9 10 11 13 session 13 2025 BMJ.pptx
file://file_00000000f1ec7207900c7d193f91a579