ECON3123
Macroeconomic Theory I

Tutorial #10: The IS-LM-PC model (cont.)

Today's tutorial

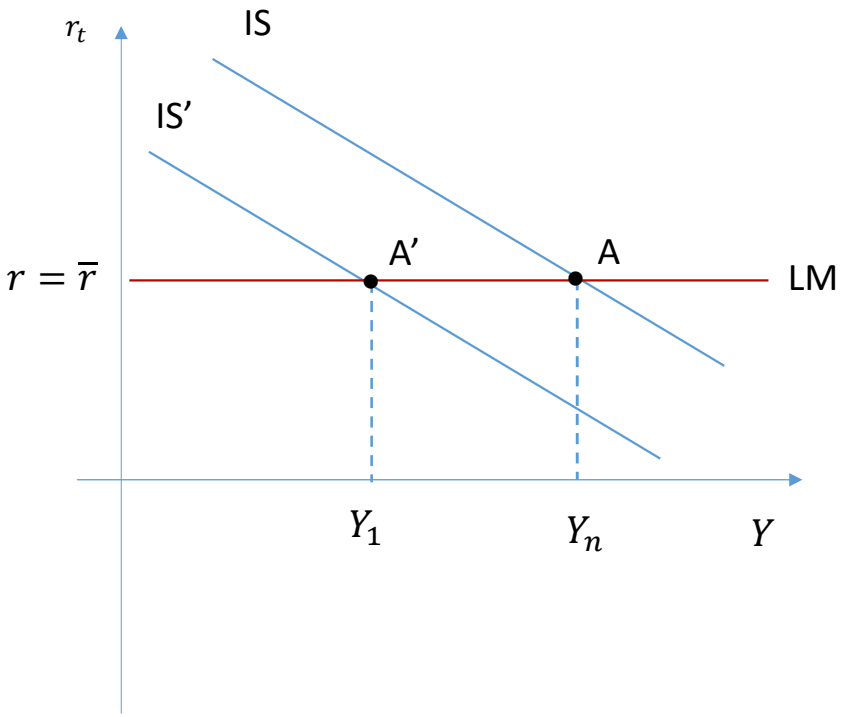
- A fall in consumer confidence and the impact of policy responses in the IS-LM-PC model
- In the midst of the COVID-19 outbreak, what has been happening to the oil price and what is its likely impact?
- What can we say about the combined likely impact of COVID-19 and the oil price on the world economy?

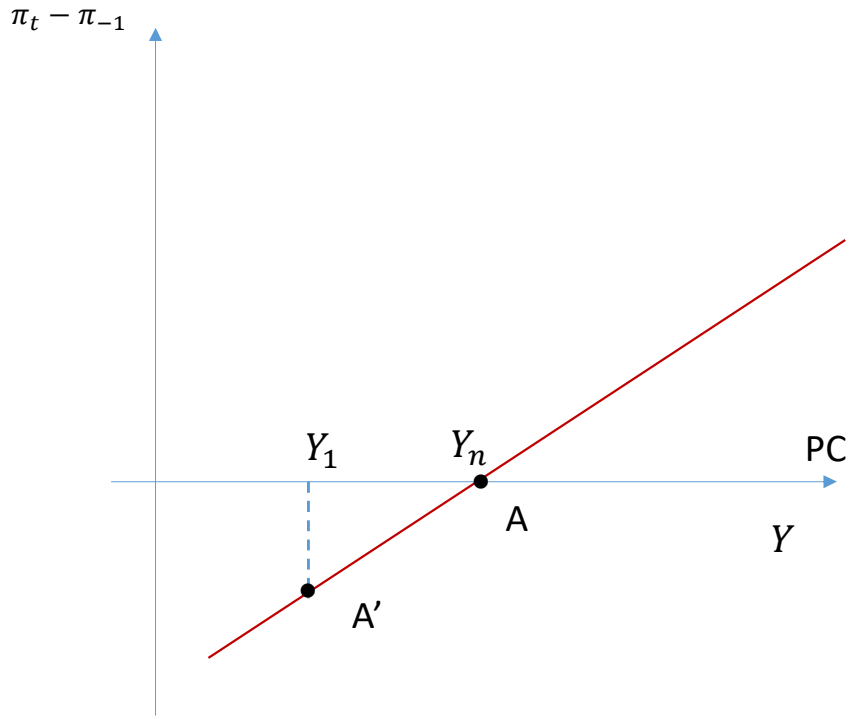
Example: A loss of consumer confidence

- Assume the IS-LM-PC model with $\pi_t^e = \pi_{-1}$
  - IS: $Y_t = C(Y_t - T) + I(r_t + x, Y_t) + G$
  - LM: $r_t = \overline{r}$
  - PC: $\pi_t - \pi_t^e = \frac{\alpha}{AL}(Y_t - Y_n)$
- Suppose that the economy starts at medium term equilibrium, and that there is a sudden and severe drop in consumer confidence
  - That is c_0 falls

Example: A loss of consumer confidence

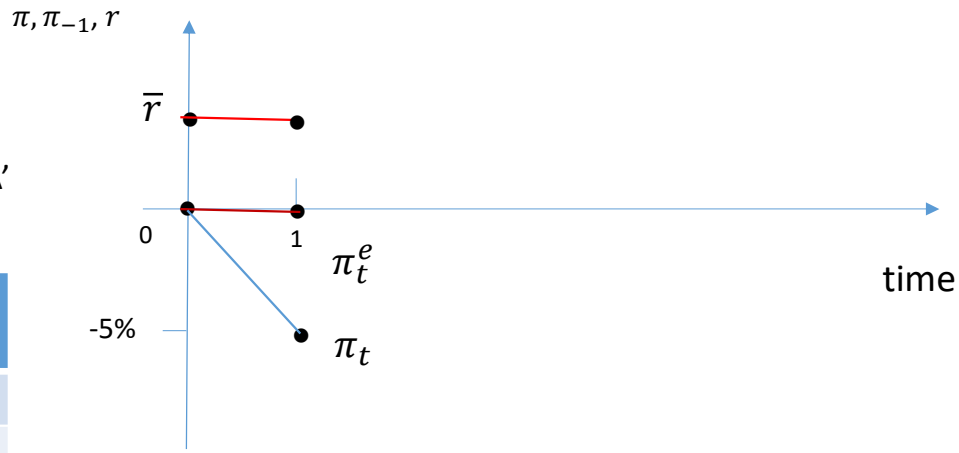
1) Show the initial equilibrium on a diagram, and show where the economy moves to in the short term as a result of the fall in consumer confidence





Example: A loss of consumer confidence

- We have PC: $\pi_t - \pi_t^e = \frac{\alpha}{AL}(Y_t - Y_n)$
- Assume $\frac{\alpha}{AL} = 0.005$
- At $t = 0$, economy at A
- At $t = 1$, consumer confidence falls and economy moves to A'



Time	Event	$\pi_t^e = \pi_{-1}$	Y_t	Y_n	π_t	$\pi_t - \pi_t^e$
0		0.0%	100	100	0.0%	0.0%
1	Fall in c_0	0.0%	90	100	-5.0%	-5.0%

Example: A loss of consumer confidence

We have $\Delta Y < 0$ and $\Delta\, c_0 < 0$

Wage setting: $W = AP^e(1 - \alpha u + z)$

Price setting: $P = \frac{W}{A}(1 + m)$

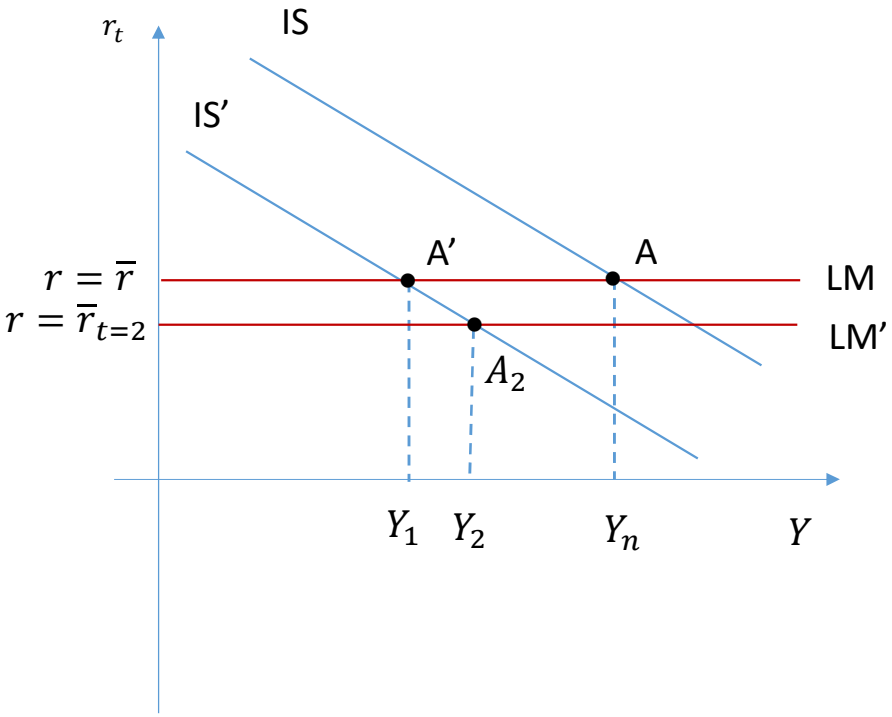
1) At $t = 1$ we have:

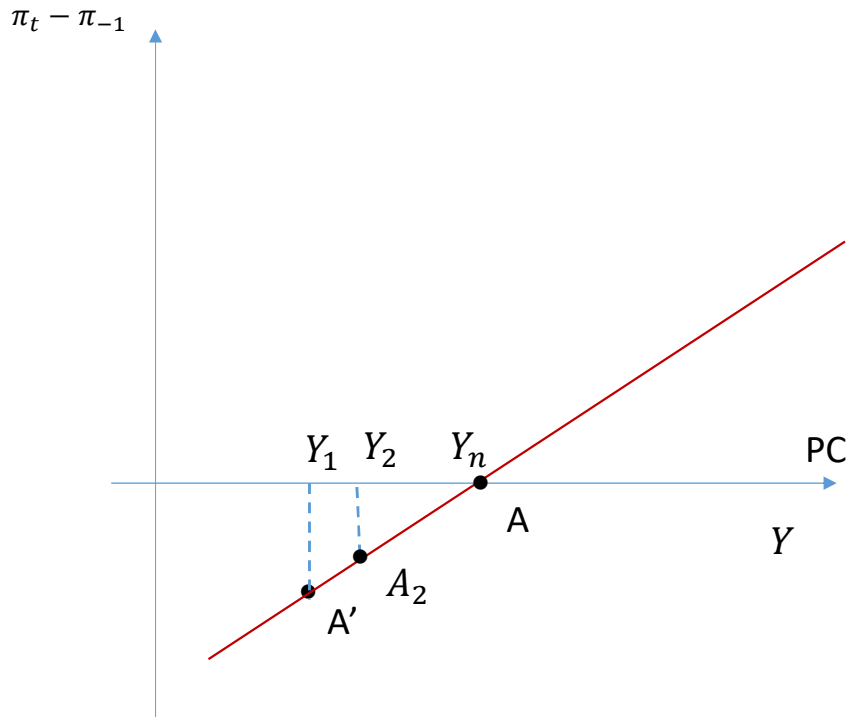
variable	effect	variable	effect
C	$\downarrow$	W/P	$-$
G	$-$	i	$-$
T	$-$	r_t	$-$
u	$\uparrow$	I	$\downarrow$
W	$\downarrow$	π_t	$\downarrow$
P	$\downarrow$	π_t^e	$-$

Example: A loss of consumer confidence

2) Now assume that beginning at time $t = 2$ the central bank cuts real interest rates four times by the same amount each time (assume 1% four times) to bring the economy back to medium term equilibrium

- At $t = 2$ we have:

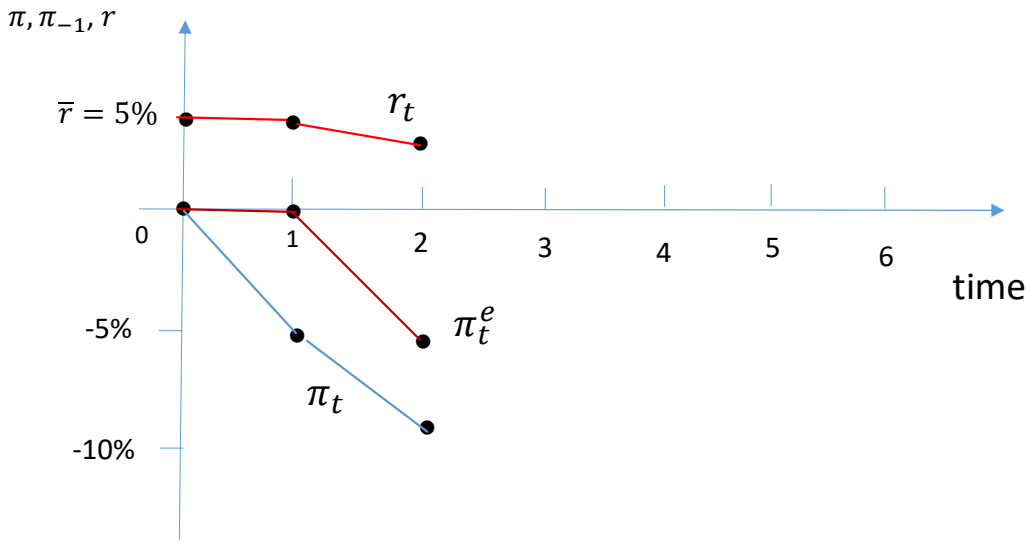




Example: A loss of consumer confidence

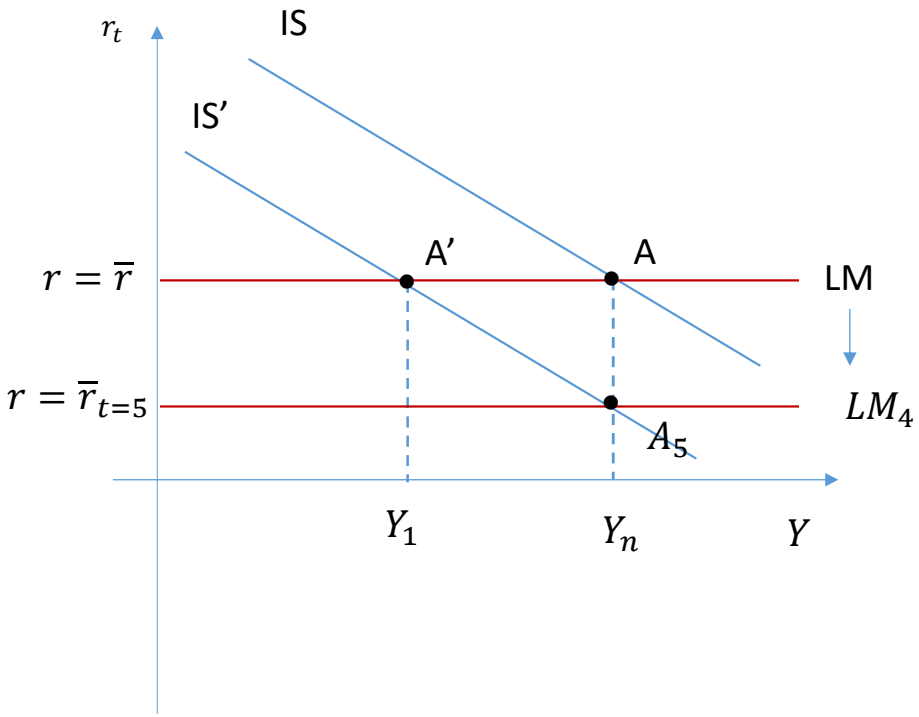
2) At $t = 2$ we have: PC: $\pi_t - \pi_t^e = 0.005(Y_t - Y_n)$

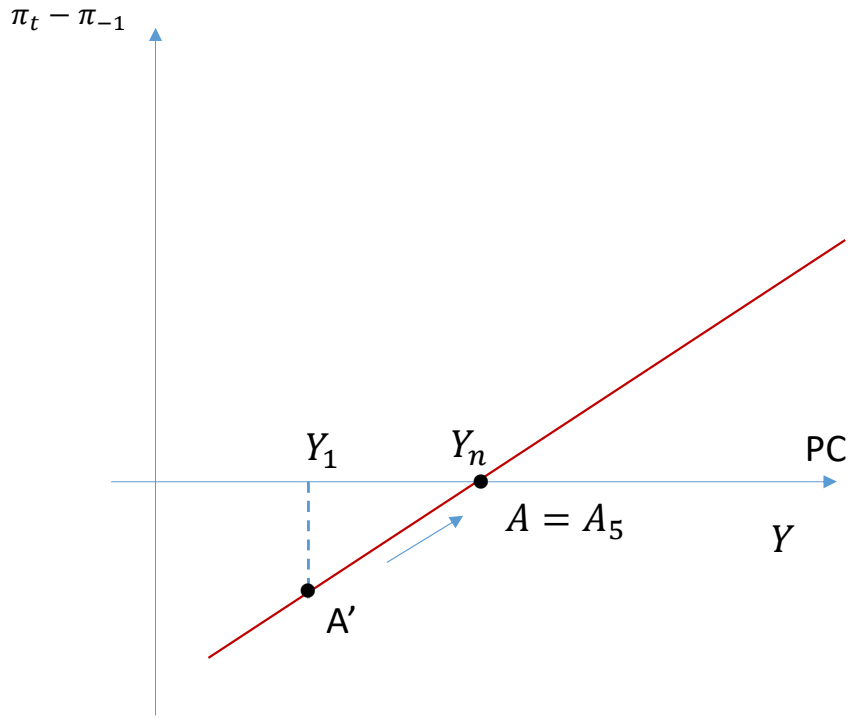
Time	Event	$\pi_t^e = \pi_{-1}$	Y_t	Y_n	π_t	$\pi_t - \pi_t^e$
0		0.0%	100	100	0.0%	0.0%
1	Fall in c_0	0.0%	90	100	-5.0%	-5.0%
2	r cut by 1% point	-5.0%	92.5	100	-8.75%	-3.75%



Example: A loss of consumer confidence

3) At $t = 5$ we have:

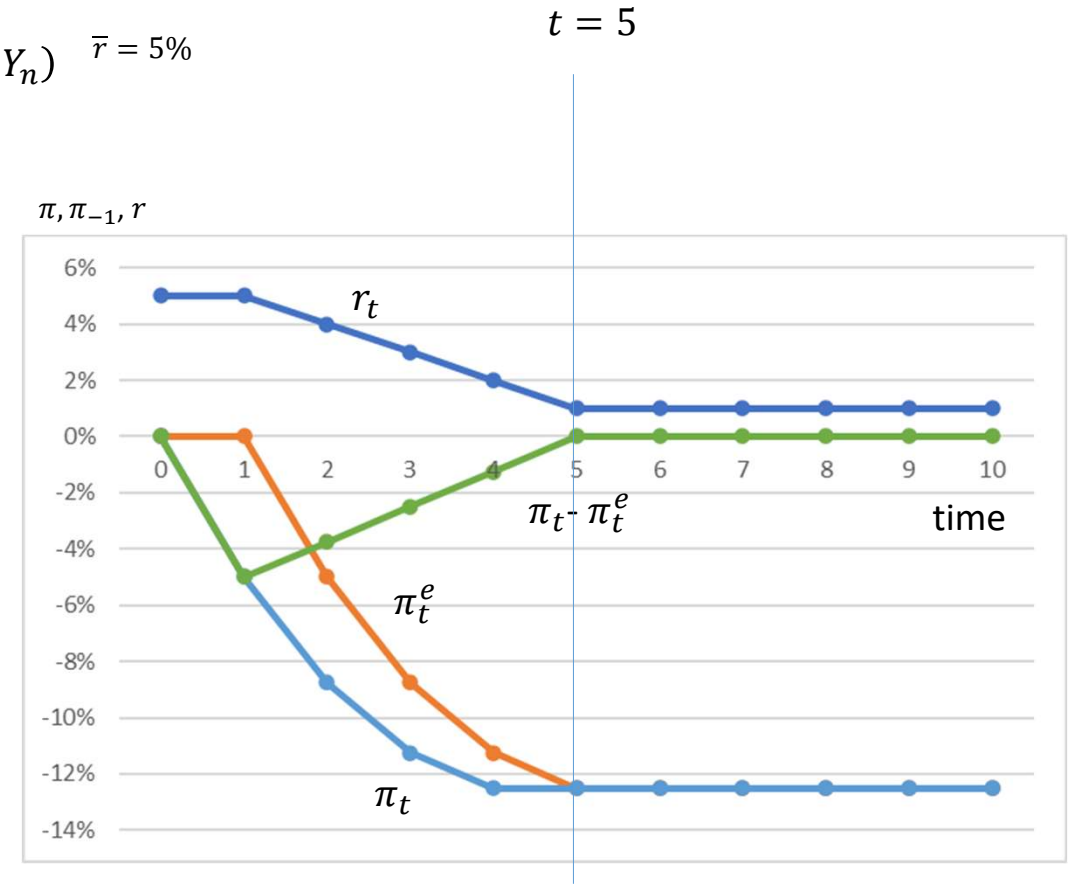




Example: A loss of consumer confidence

3) At $t = 5$ we have: PC: $\pi_t - \pi_t^e = 0.005(Y_t - Y_n)$ $\bar{r} = 5\%$

Time	Event	$\pi_t^e = \pi_{-1}$	Y_t	Y_n	π_t	$\pi_t - \pi_t^e$
0		0.0%	100	100	0.0%	0.0%
1	Fall in c_0	0.0%	90	100	-5.0%	-5.0%
2	r cut by 1% point	-5.0%	92.5	100	-8.75%	-3.75%
3	r cut by 1% point	-8.75%	95	100	-11.25%	-2.5%
4	r cut by 1% point	-11.25%	97.5	100	-12.5%	-1.25%
5	r cut by 1% point	-12.5%	100	100	-12.5%	0.0%



Example: A loss of consumer confidence

4) At $t = 5$ onwards, the economy is at medium term equilibrium with $Y_t = Y_n$

Time	Event	$\pi_t^e = \pi_{-1}$	Y_t	Y_n	π_t	$\pi_t - \pi_t^e$
0		0.0%	100	100	0.0%	0.0%
1	Fall in c_0	0.0%	90	100	-5.0%	-5.0%
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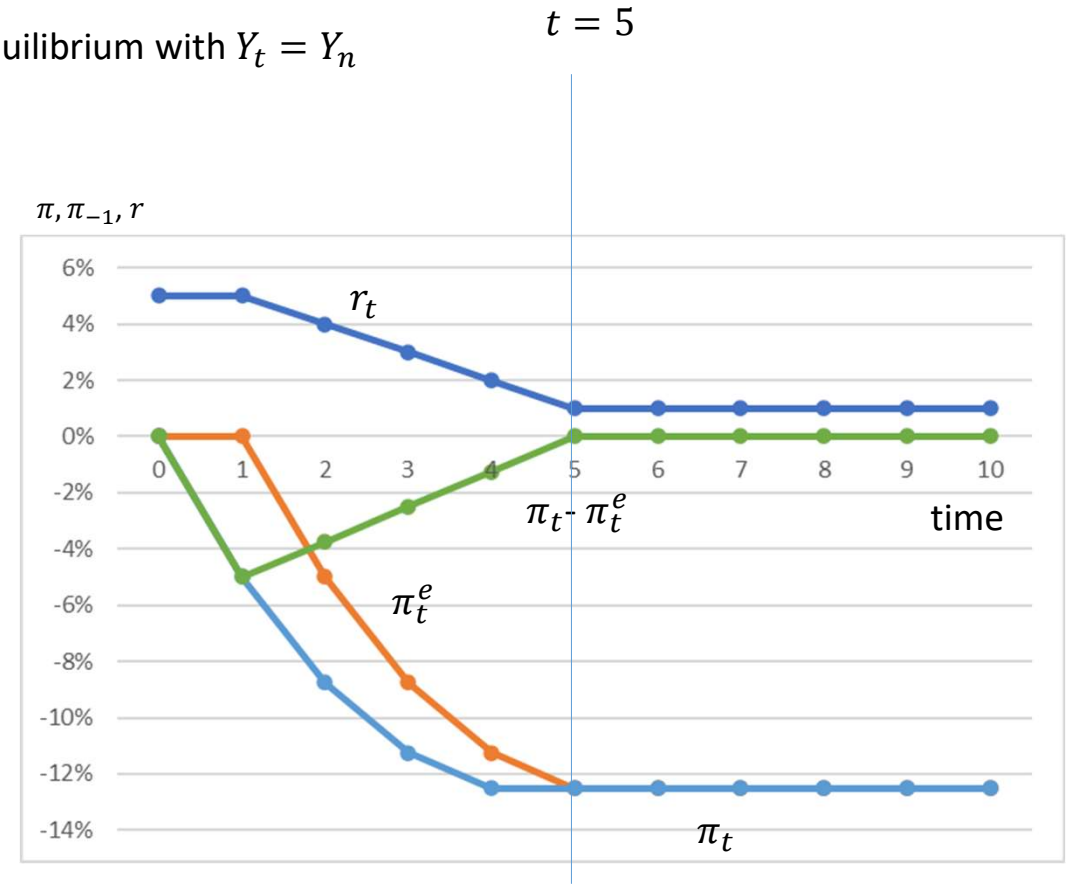
4	r cut by 1% point	-11.25%	97.5	100	-12.5%	-1.25%
5	r cut by 1% point	-12.5%	100	100	-12.5%	0.0%
6		-12.5%	100	100	-12.5%	0.0%
7		-12.5%	100	100	-12.5%	0.0%
8		-12.5%	100	100	-12.5%	0.0%
9		-12.5%	100	100	-12.5%	0.0%
10		-12.5%	100	100	-12.5%	0.0%



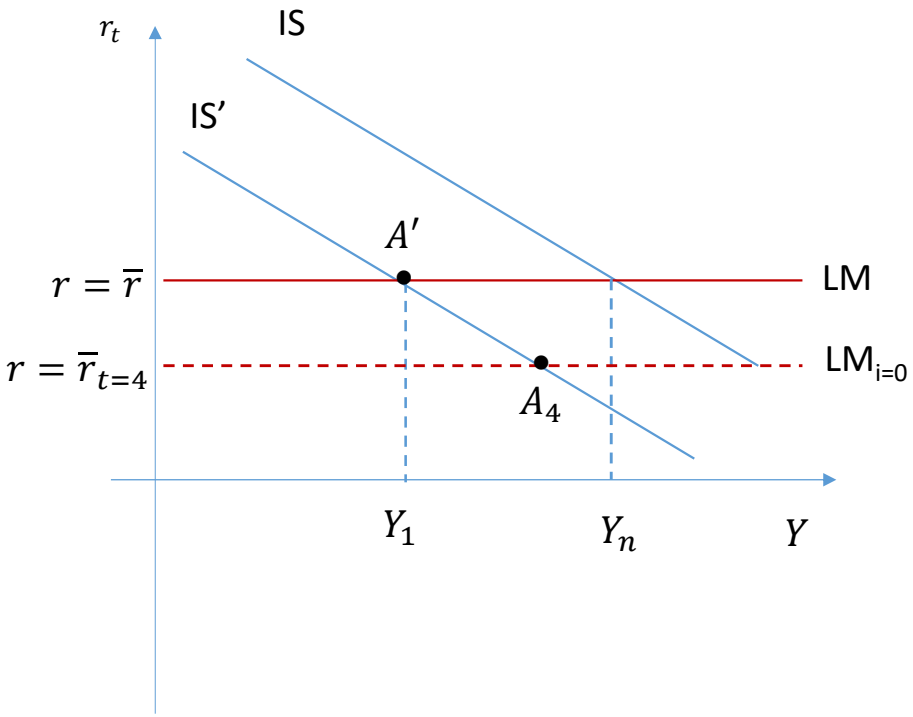
Example: A loss of consumer confidence

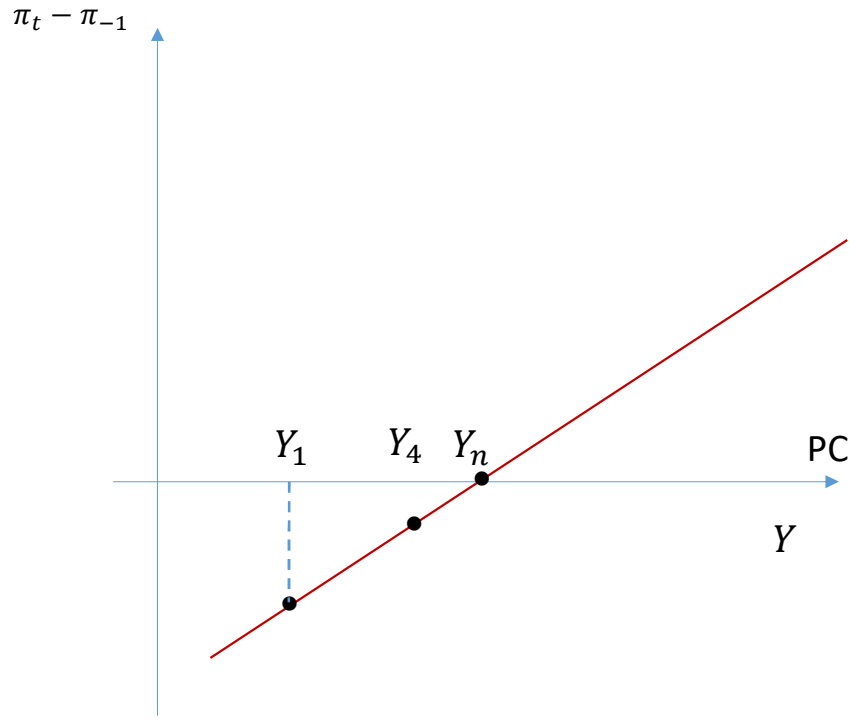
11) In the medium term what has happened to the following compared to the initial equilibrium (ie compared to point A) in this case (ie zero lower bound and increased government spending)?

variable	effect	variable	effect
Y	–	P	$\downarrow$
C	$\downarrow$	W/P	–
G	–	i	$\downarrow$
T	–	r_t	$\downarrow$
u	–	I	$\uparrow$
W	$\downarrow$	π_t	$\downarrow$

Example: A loss of consumer confidence

5) What would happen if nominal interest rates, i, reached zero before the adjustment process was complete? That is, before the economy had returned to Y_n?





Example: A loss of consumer confidence

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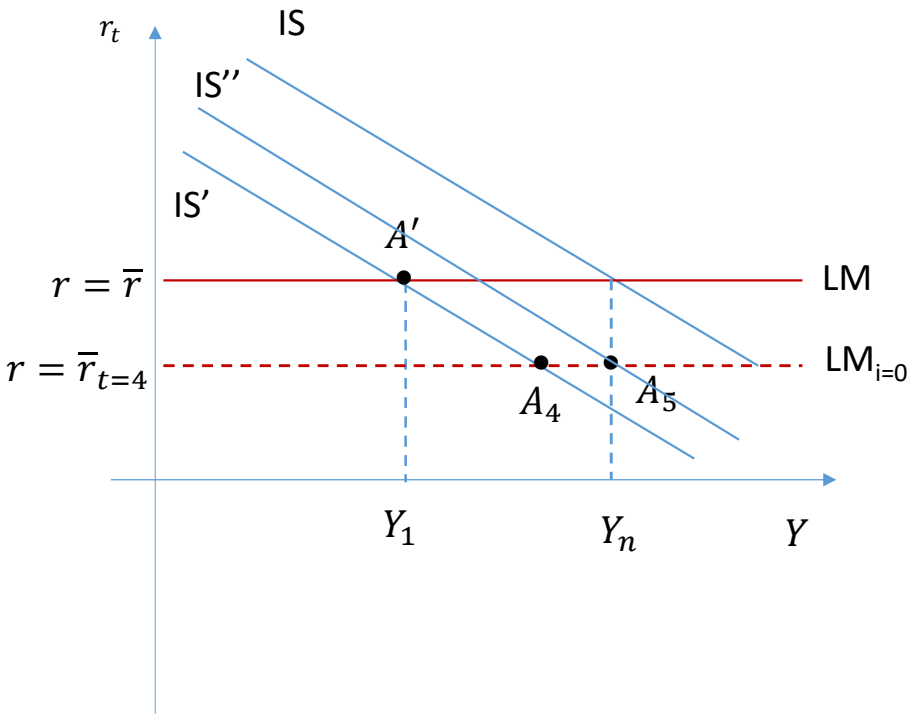
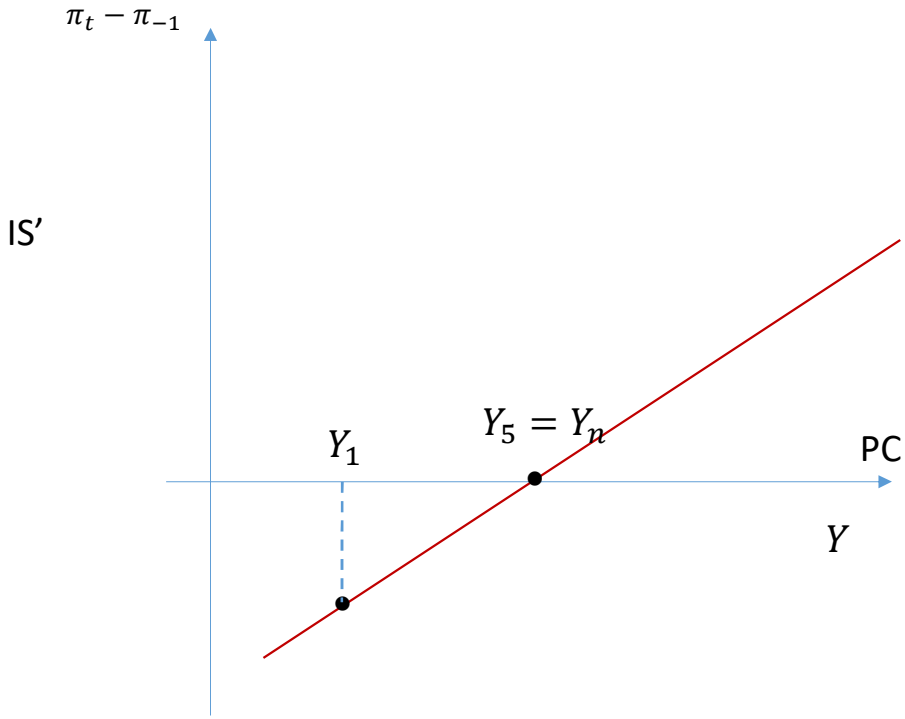
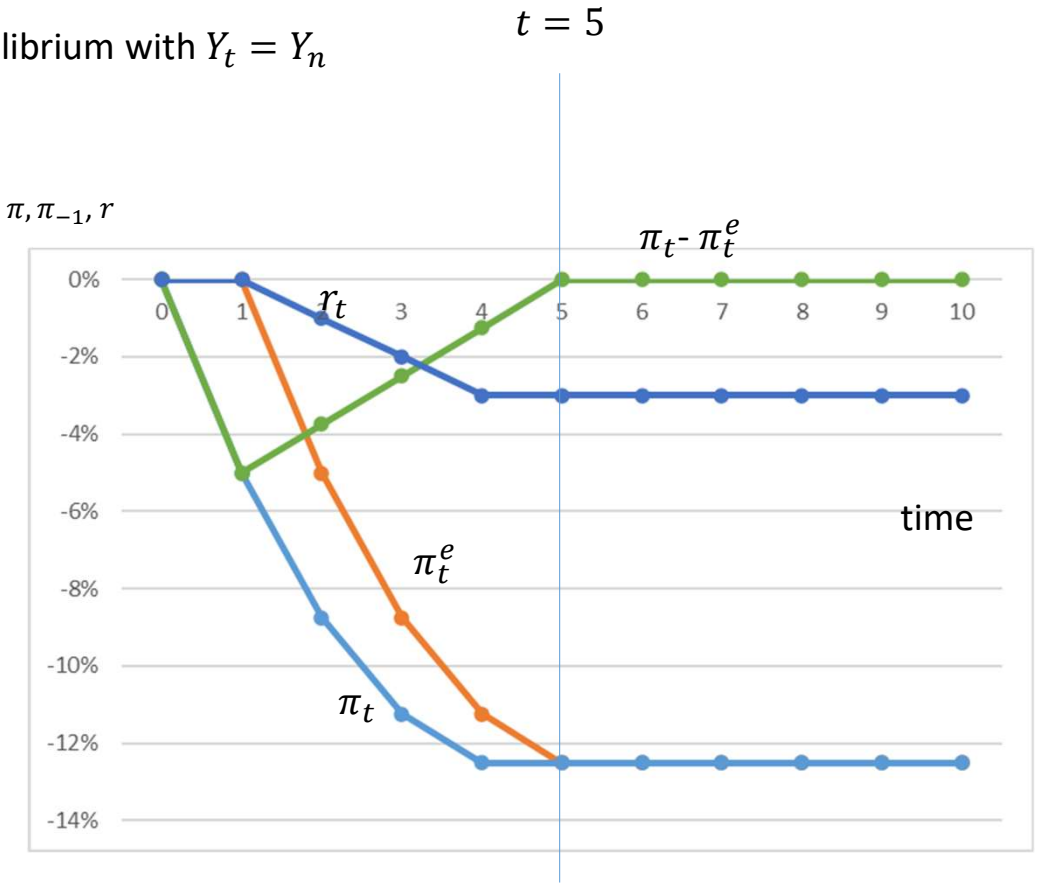




Example: A loss of consumer confidence

5) At $t = 5$ onwards, the economy is at medium term equilibrium with $Y_t = Y_n$

Time	Event	$\pi_t^e = \pi_{-1}$	Y_t	Y_n	π_t	$\pi_t - \pi_t^e$
0		0.0%	100	100	0.0%	0.0%
1	Fall in c_0	0.0%	90	100	-5.0%	-5.0%
2	r cut by 1% point	-5.0%	92.5	100	-8.75%	-3.75%
3	r cut by 1% point	-8.75%	95	100	11.25%	-2.5%
4	r cut by 1% point	-11.25%	97.5	100	12.5%	-1.25%
5	Increase G	-12.5%	100	100	12.5%	0.0%
6		-12.5%	100	100	12.5%	0.0%
7		-12.5%	100	100	12.5%	0.0%
8		-12.5%	100	100	12.5%	0.0%
9		-12.5%	100	100	12.5%	0.0%
10		-12.5%	100	100	12.5%	0.0%



Example: A loss of consumer confidence

6) Why doesn't the government just increase G at the beginning to avoid the problems of zero nominal interest rates?

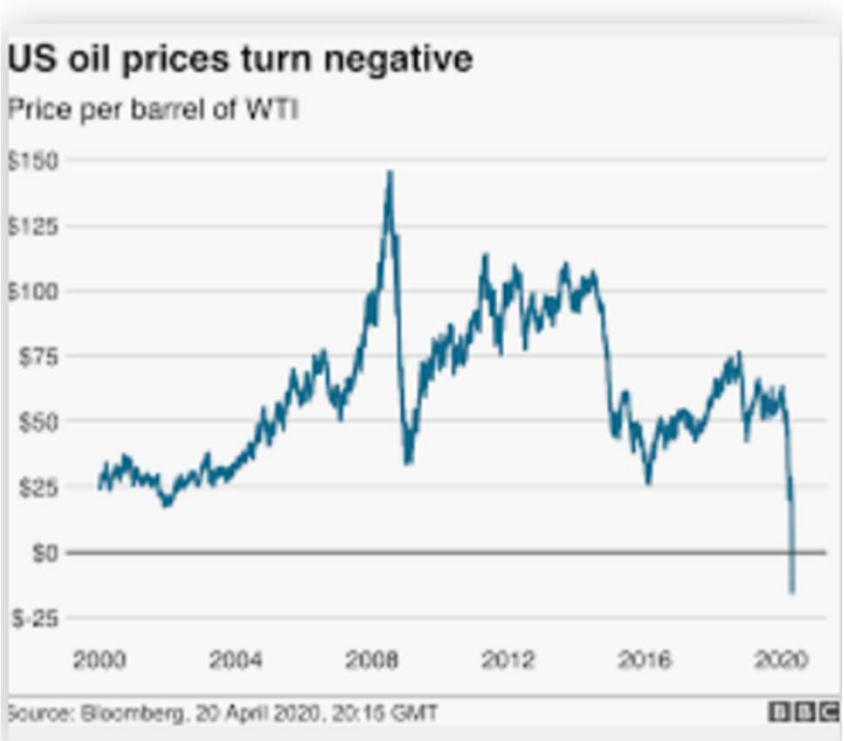
- For the reasons mentioned previously:
  - Fiscal policy takes longer to agree and implement and is more difficult to reverse
  - Fiscal policy tends to take place in large discrete amounts, compared to monetary policy which can be implemented in smaller amounts
  - Monetary policy can be more responsive to changing economic conditions
    - Can take advantage of positive feedback loops

Example: A loss of consumer confidence

11) In the medium term what has happened to the following compared to the initial equilibrium (ie compared to point A) in this case (ie zero lower bound and increased government spending)?

variable	effect	variable	effect
Y	–	P	$\downarrow$
C	$\downarrow$	W/P	–
G	$\uparrow$	i	$\downarrow$
T	–	r_t	$\downarrow$
u	–	I	$\uparrow$
W	$\downarrow$	π_t	$\downarrow$

What's been happening to the price of oil recently?



- Since the beginning of 2020, the price of oil has collapsed by around 70%
- At one point in April, the oil price went negative for a brief period:

WTI crude price goes negative for the first time in history

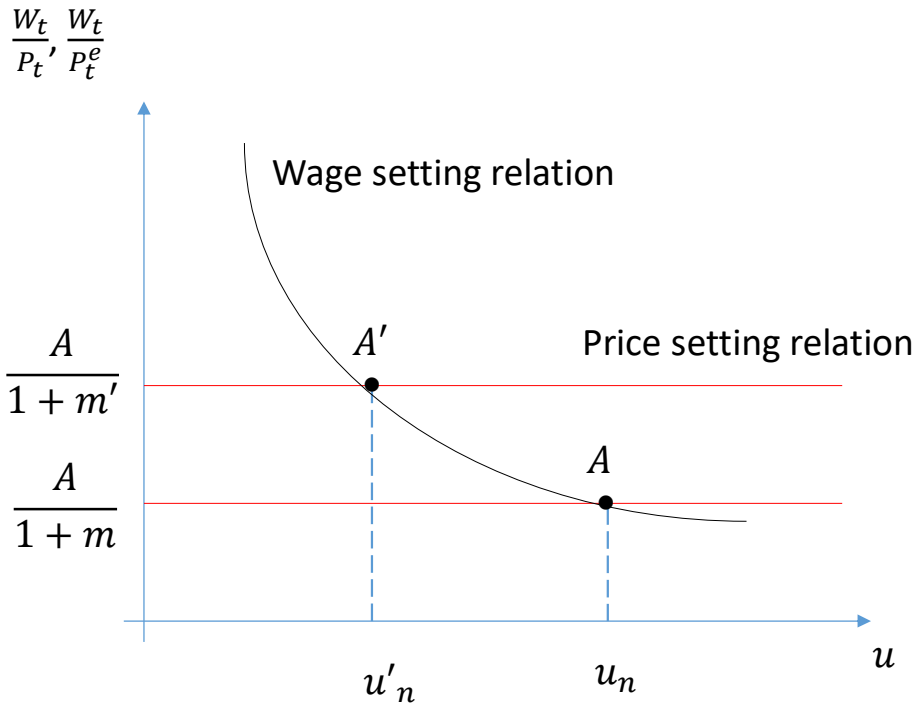
By CAMERON WALLACE on 4/20/2020

- You would be paid to 'buy' oil!
- This has been caused by the collapse of a production agreement between Saudi Arabia and Russia, with both countries increasing production very aggressively

Source: Bloomberg, World Oil

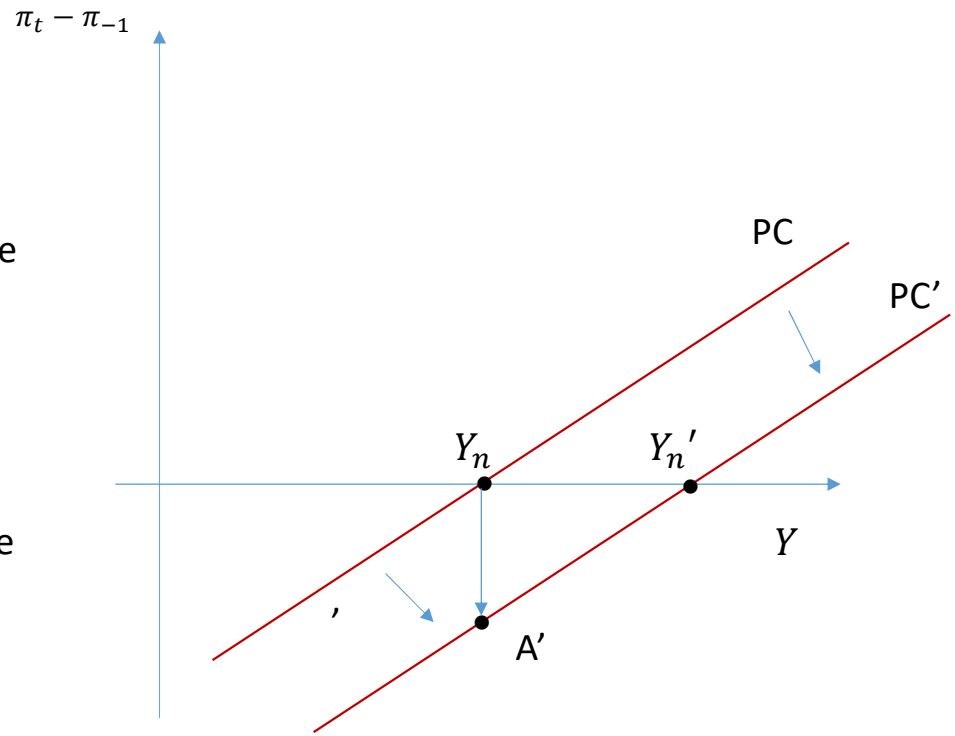
What will be the impact on the world economy of the fall in the oil price?

- Price setting: $\frac{W_t}{P_t} = \frac{(1+m)}{A}$
- Wage setting: $\frac{W_t}{P_t^e} = A\,(1 - \alpha u_t + z)$
- At $P_t = P_t^e$ we have:
  - Natural rate of unemployment: $u_n = \frac{m+z}{\alpha}$
- We model the fall in the price of oil as a reduction in m
  - Firms costs are reduced and so they can hire more workers to produce at the same level of cost as before
- Therefore, the Price setting relation shifts upwards, and the natural rate of unemployment falls



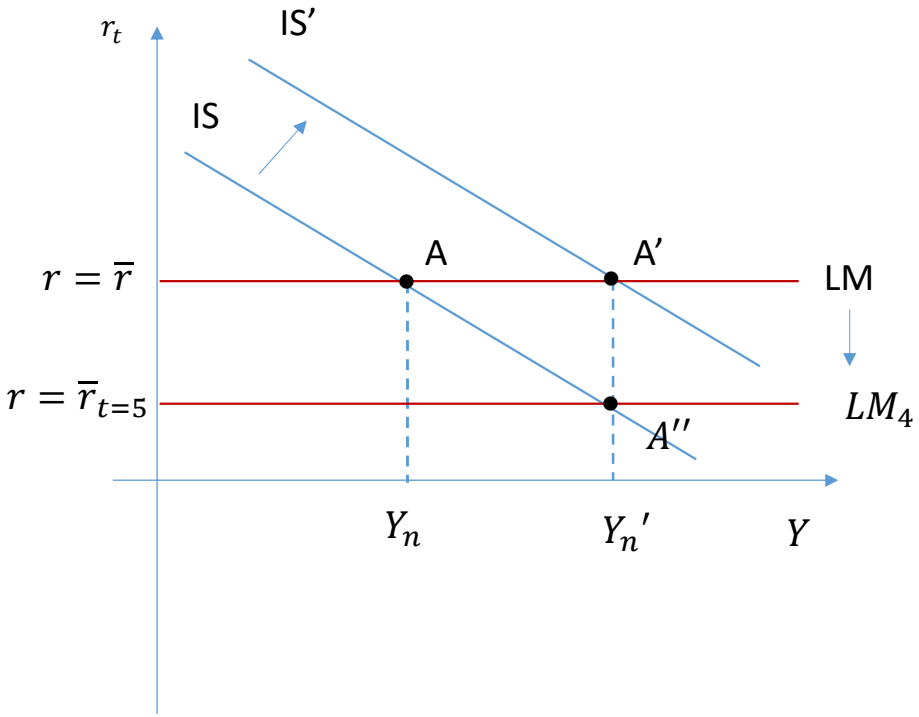
What does the IS-LM-PC model tell us about the fall in the oil price?

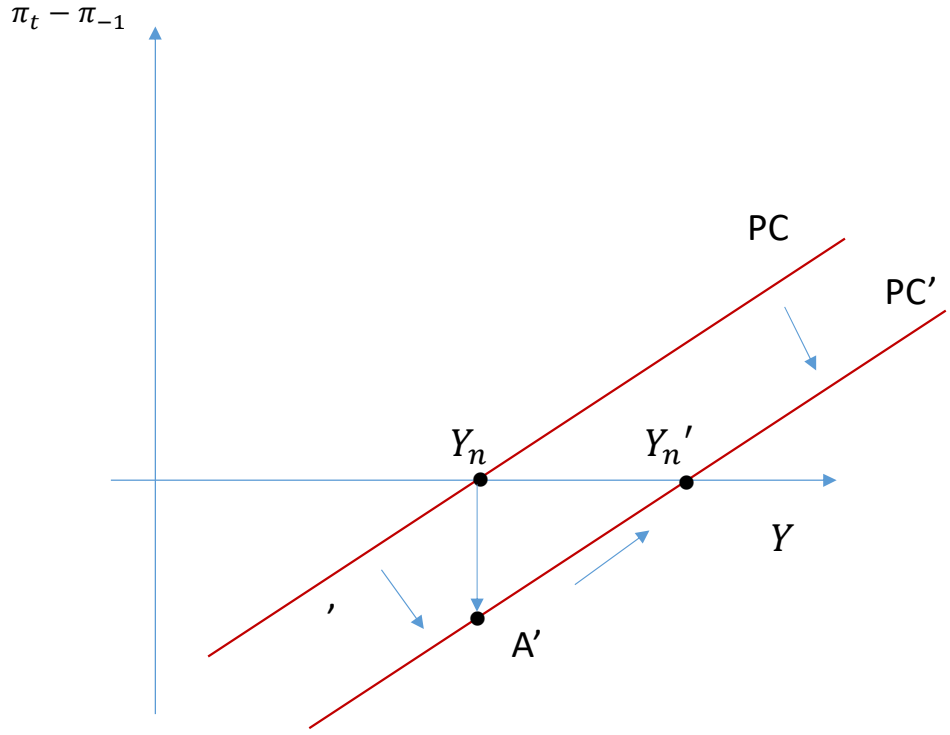
- The fall in u_n is equivalent to an increase in Y_n
- An increase in Y_n causes the Phillips curve to shift downwards and to the right:
- PC: $\pi_t - \pi_t^e = \frac{\alpha}{AL}(Y_t - Y_n)$
- At A', the economy experiences deflation
- Fiscal policy and/or monetary policy can be used to drive the economy to its medium term equilibrium Y_n'
- Notice that Y_n' is bigger than Y_n so the lower oil price has made the country wealthier
  - In this model, a lower oil price is a good thing in the medium term



What does the IS-LM-PC model tell us about the fall in the oil price?

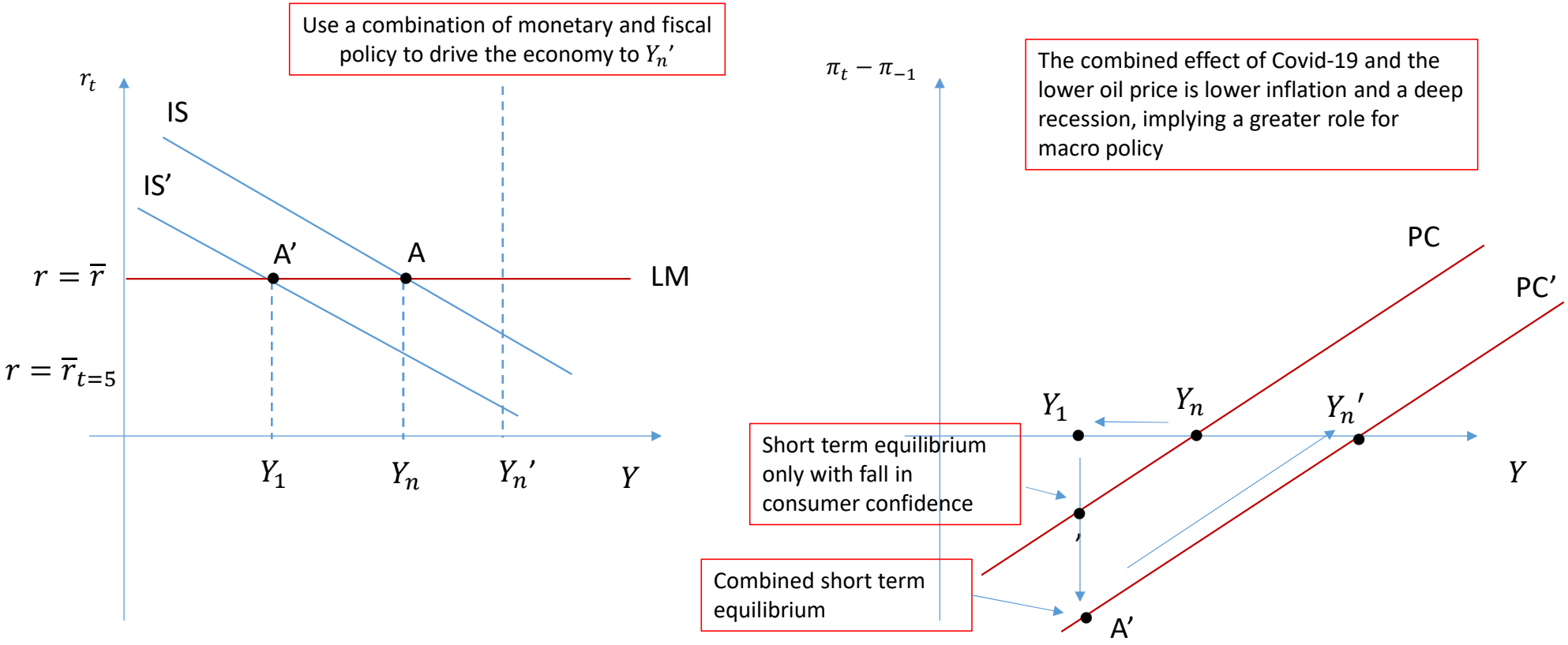
- Either fiscal policy or monetary policy or both can be used to drive the economy to the medium term equilibrium at A''





So what happens with COVID-19 and the lower oil price?

- We can put the effects of the fall in consumer confidence and the lower oil price together



COVID-19 and the lower oil price: Conclusions

- The fall in consumer confidence associated with COVID-19 is a negative demand shock, leading to recession and lower inflation in the short term
- The lower oil price increases the natural level of income, and so makes countries (that are net importers of oil) richer in the medium term
- In the short term, the lower oil price also reduces inflation
- The combined effect of COVID-19 and the lower oil price implies a very significant role for macroeconomic policy around the world
- But nominal interest rates are close to zero in much of the world, so the Zero Lower Bound will limit how much monetary policy can be used
- Therefore, a much more important role for fiscal policy
- Prediction: Governments around the world will announce very large fiscal stimulus packages during the rest of the year