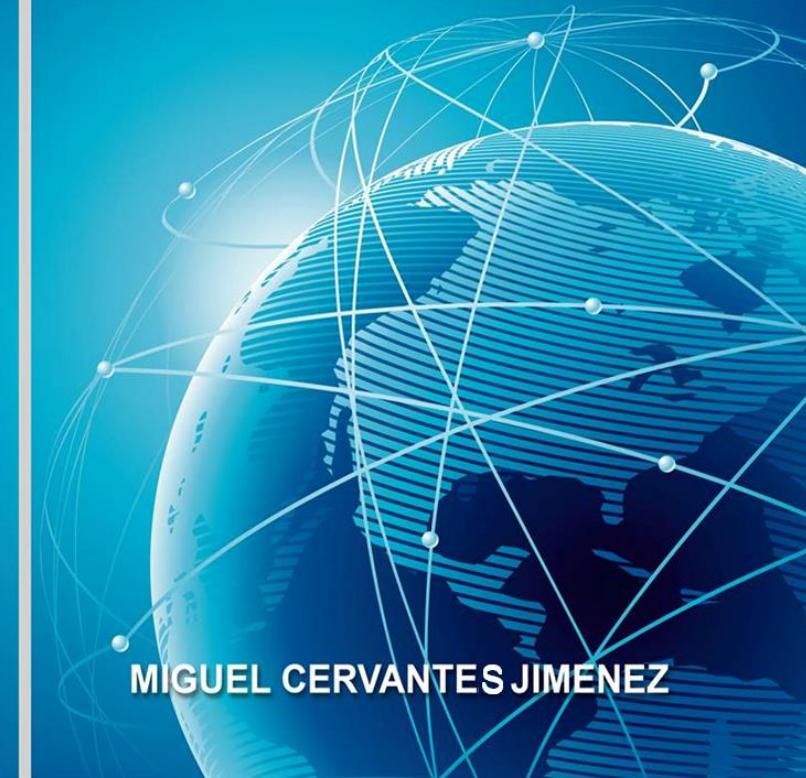


MACROECONOMÍA ABIERTA

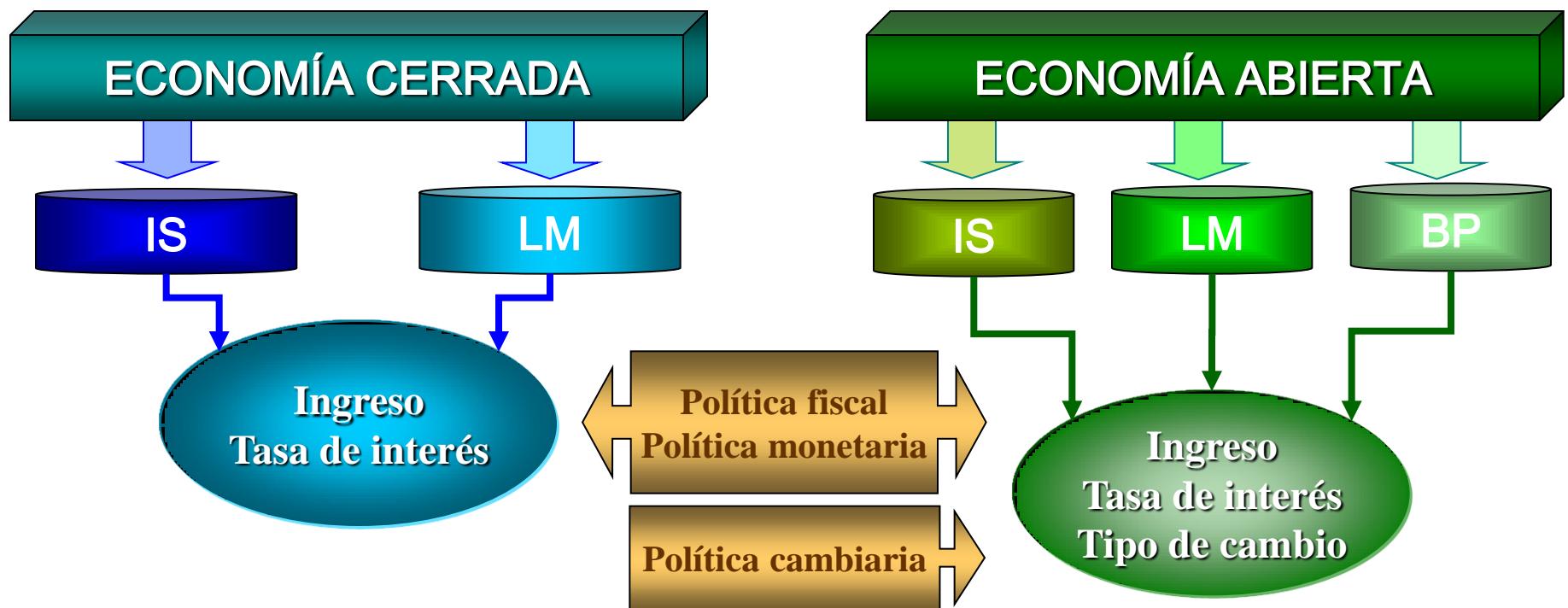
TEORÍA, POLÍTICA, SIMULADORES COMPUTACIONALES Y RETOS

MACROECONOMÍA ABIERTA

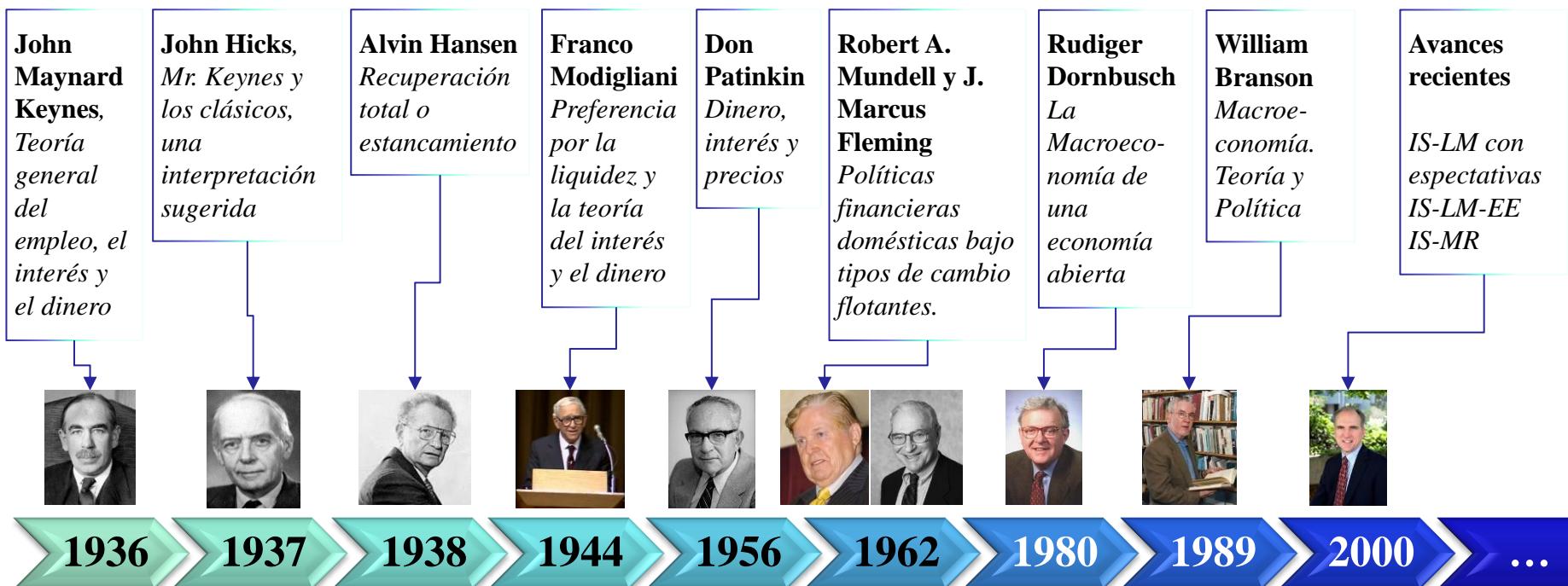


MIGUEL CERVANTES JIMÉNEZ

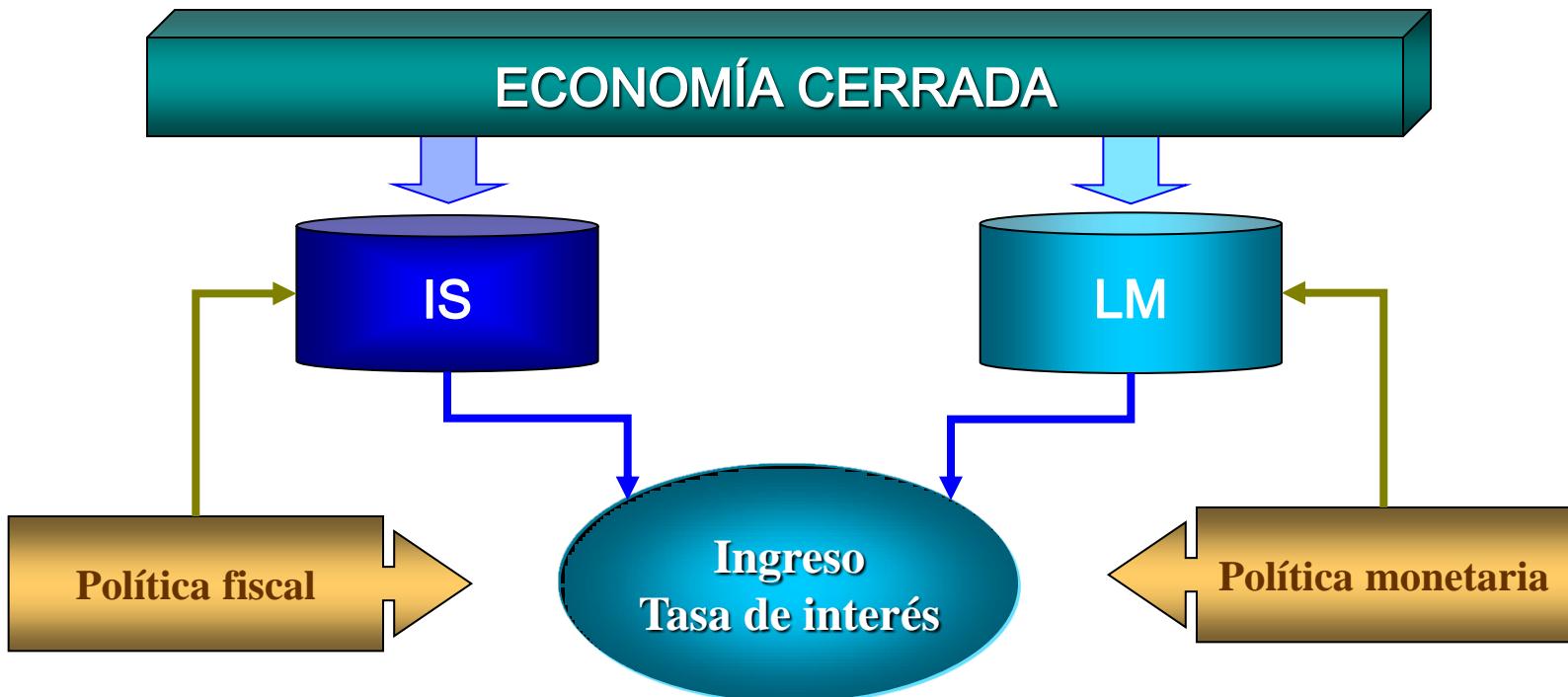
EL MODELO IS-LM-BP



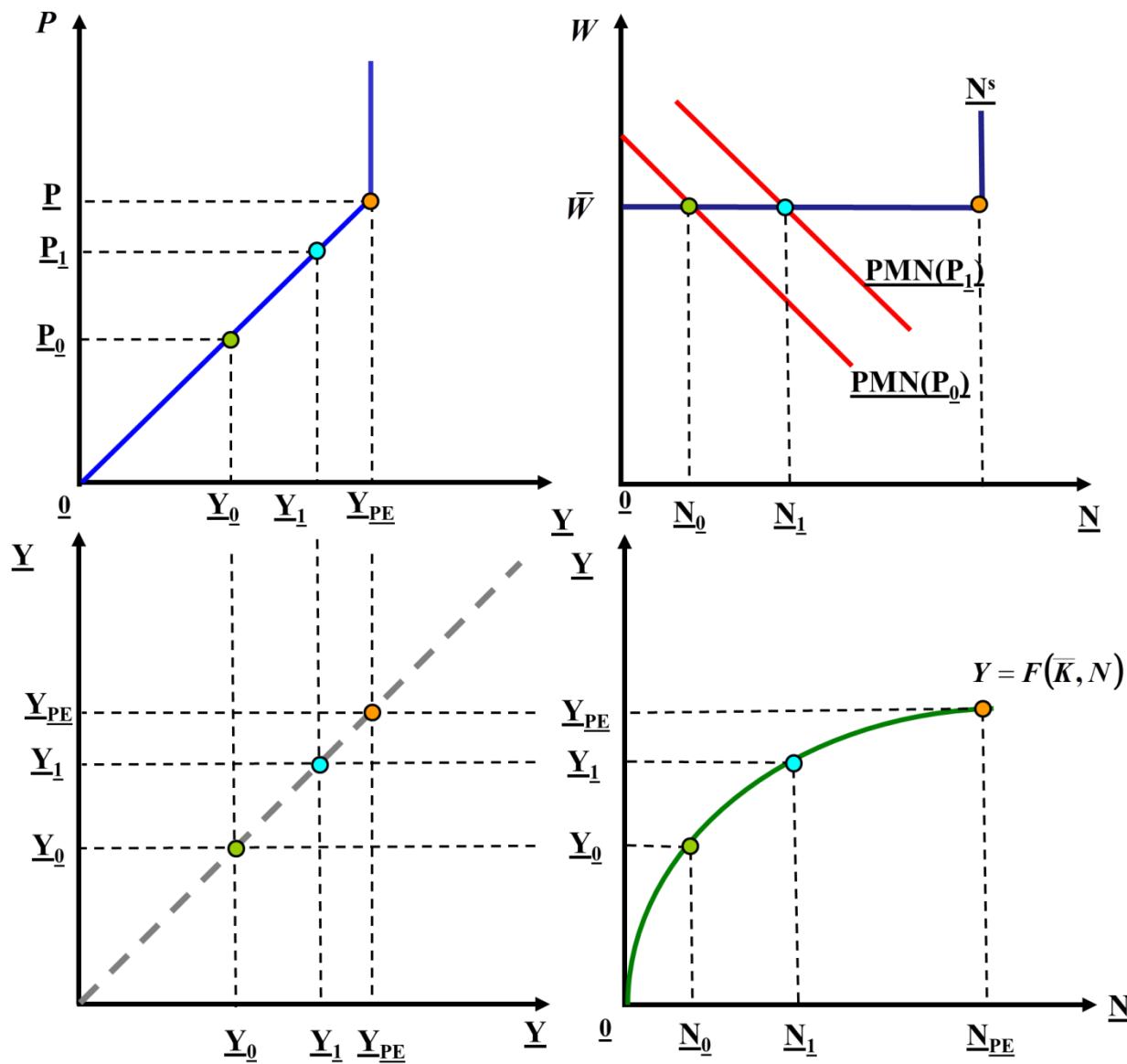
LÍNEA DEL TIEMPO



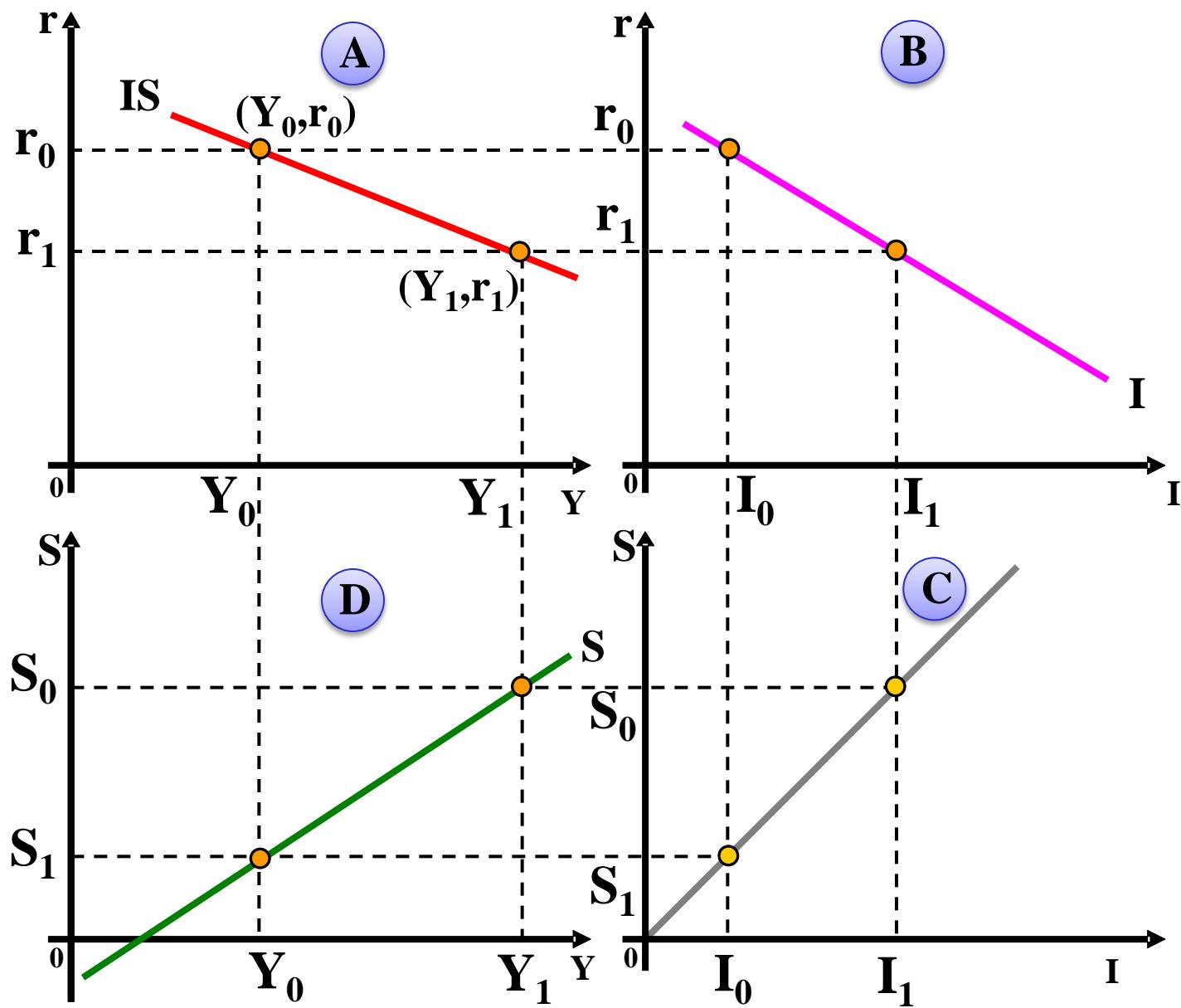
IS-LM: ECONOMÍA CERRADA CON GOBIERNO Y PRECIOS RÍGIDOS



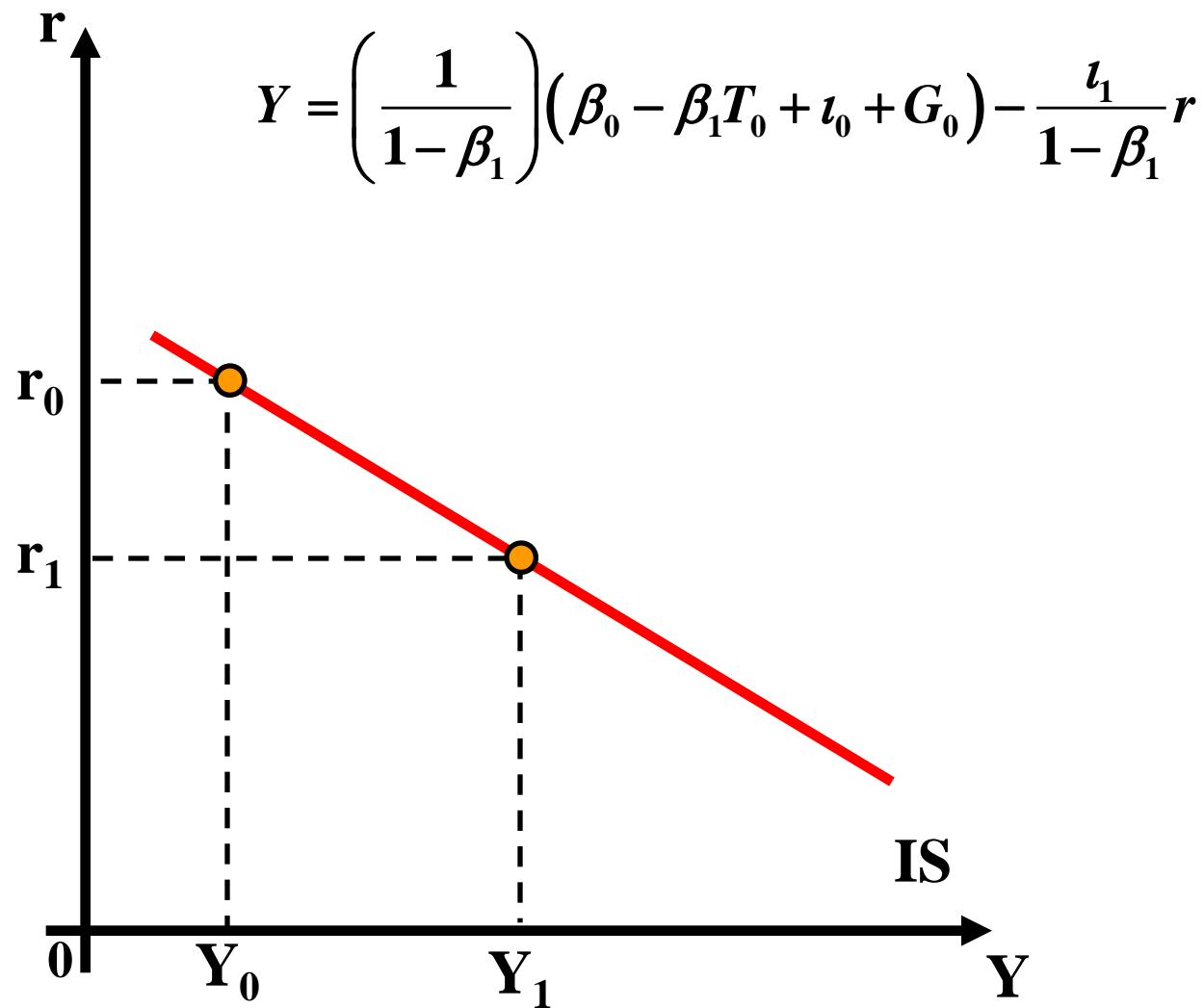
MERCADO DE TRABAJO



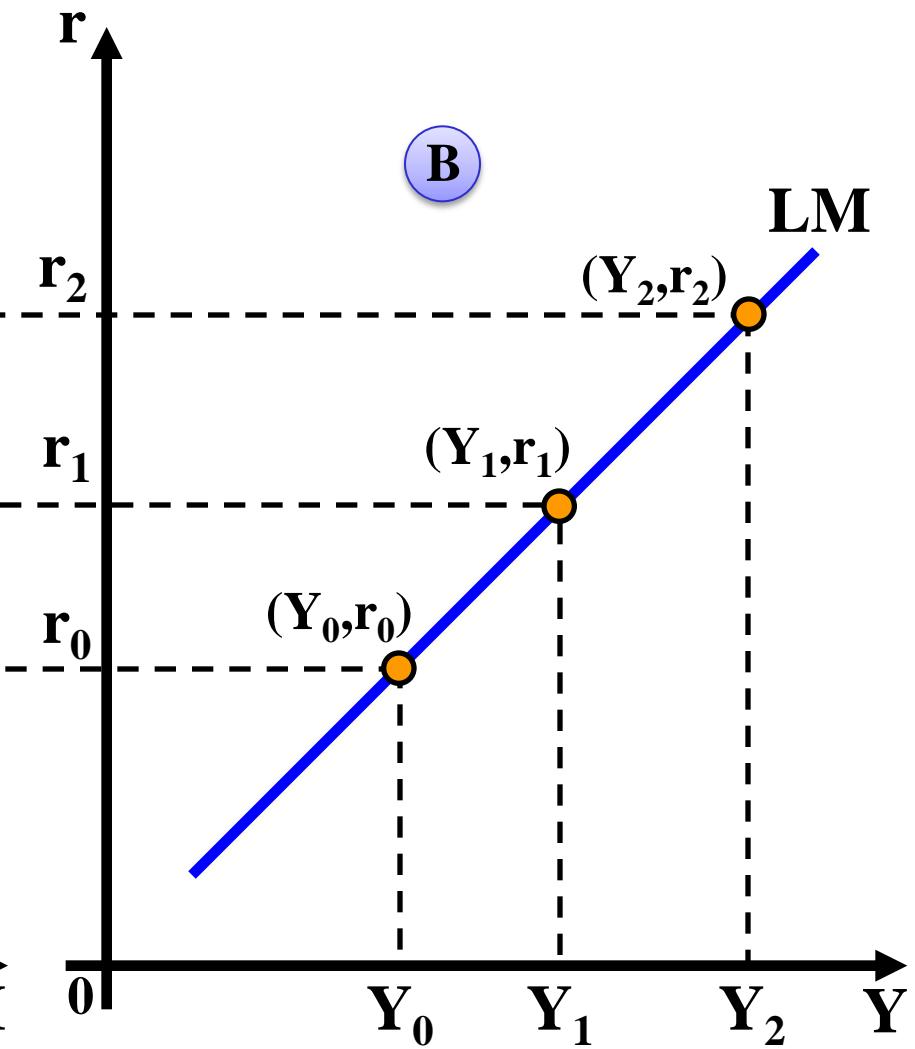
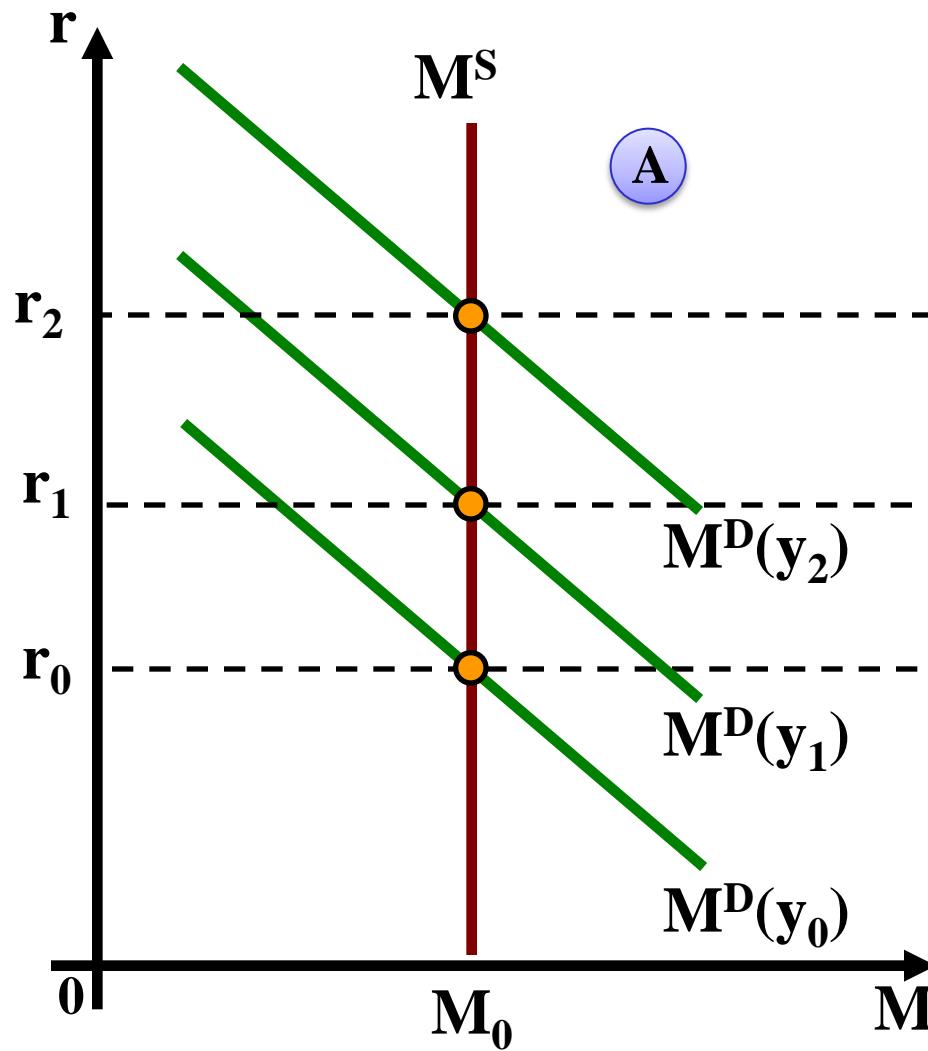
CONSTRUCCIÓN CURVA IS



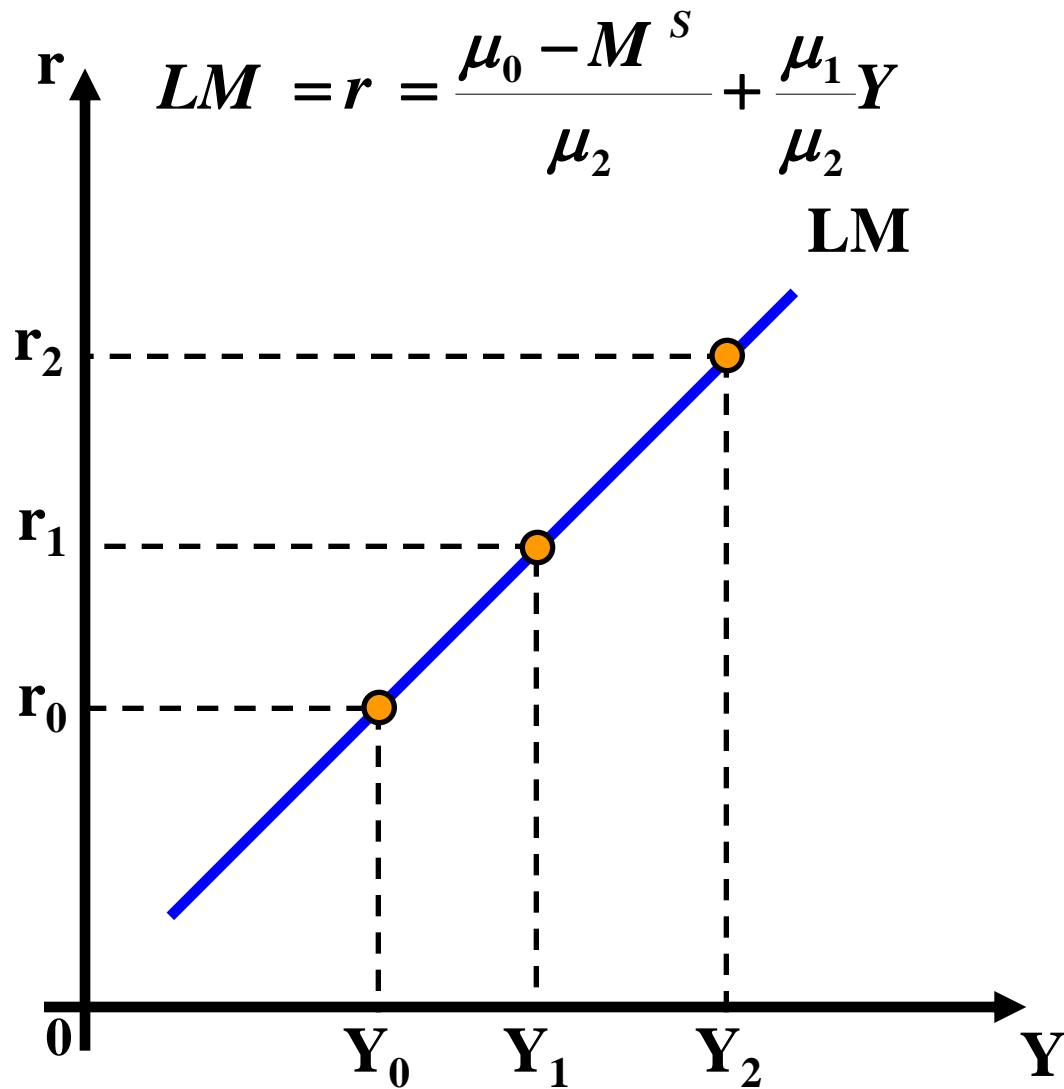
CURVA IS



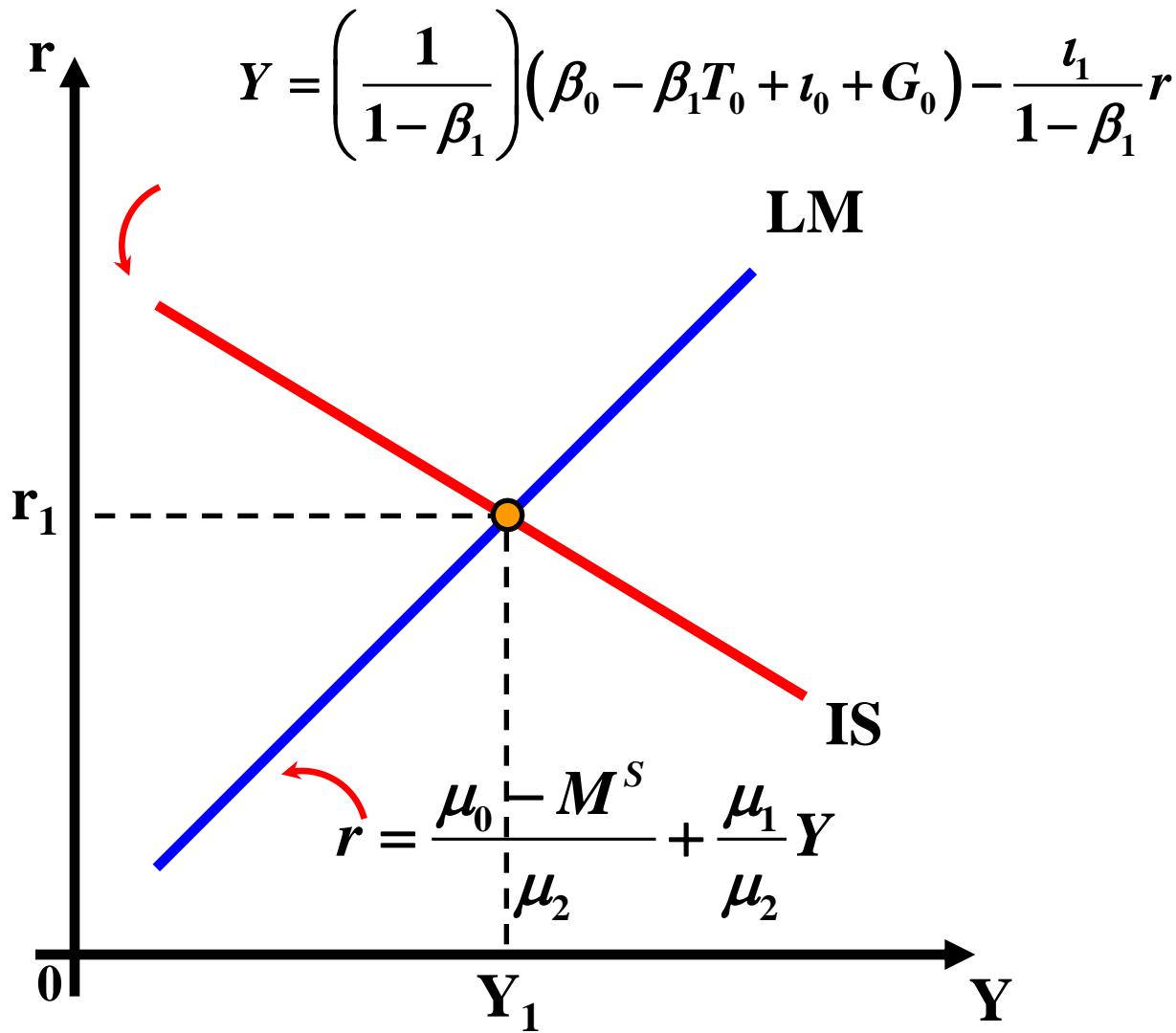
CONSTRUCCIÓN CURVA LM



CURVA LM



EQUILIBRIO IS-LM



EQUILIBRIO IS-LM

$$Y = \left(\frac{1}{1-\beta_1} \right) (\beta_0 - \beta_1 T_0 + \iota_0 + G_0) - \frac{\iota_1}{1-\beta_1} r \quad \curvearrowleft \quad r = \frac{\mu_0 - M^S}{\mu_2} + \frac{\mu_1}{\mu_2} Y$$

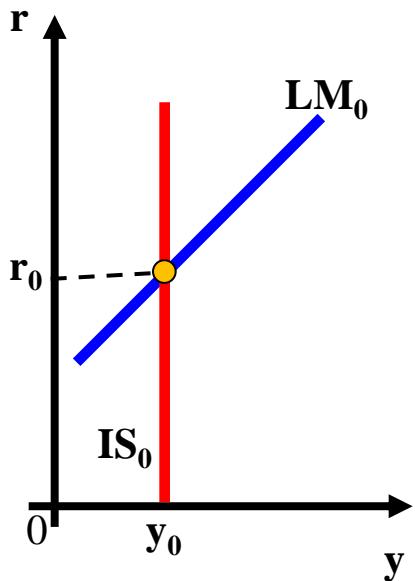
$$Y^* = \left(\frac{1}{1-\beta_1 + \frac{\iota_1 \mu_1}{\mu_2}} \right) \left((\beta_0 - \beta_1 T_0 + \iota_0 + G_0) - (\iota_1) \left(\frac{\mu_0 - M^S}{\mu_2} \right) \right)$$

$$r = \frac{\mu_0 - M^S}{\mu_2} + \frac{\mu_1}{\mu_2} Y \quad \curvearrowleft \quad Y = \left(\frac{1}{1-\beta_1} \right) (\beta_0 - \beta_1 T_0 + \iota_0 + G_0) - \frac{\iota_1}{1-\beta_1} r$$

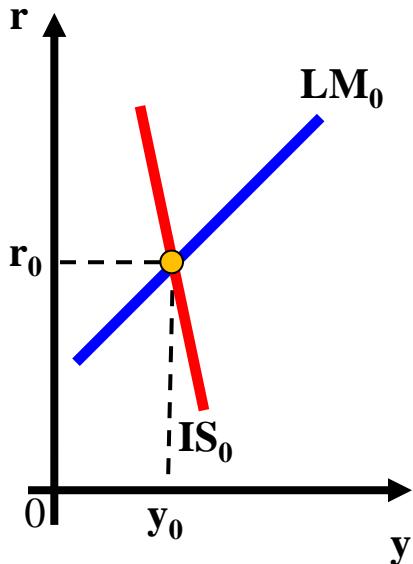
$$r^* = \left(\frac{1}{1-\beta_1 + \frac{\mu_1}{\mu_2} \iota_1} \right) \left([1-\beta_1] \left(\frac{\mu_0 - M^S}{\mu_2} \right) + \frac{\mu_1}{\mu_2} (\beta_0 - \beta_1 T_0 + \iota_0 + G_0) \right)$$

CURVA _____: eficacia de la política _____

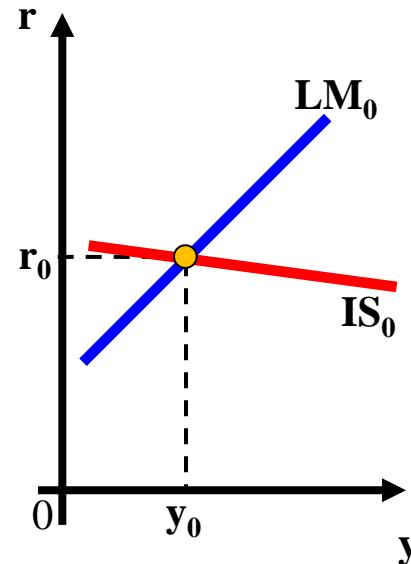
Vertical



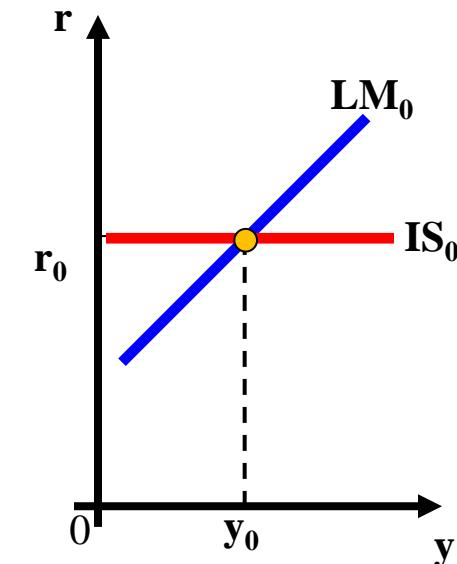
Inclinada



Aplanada

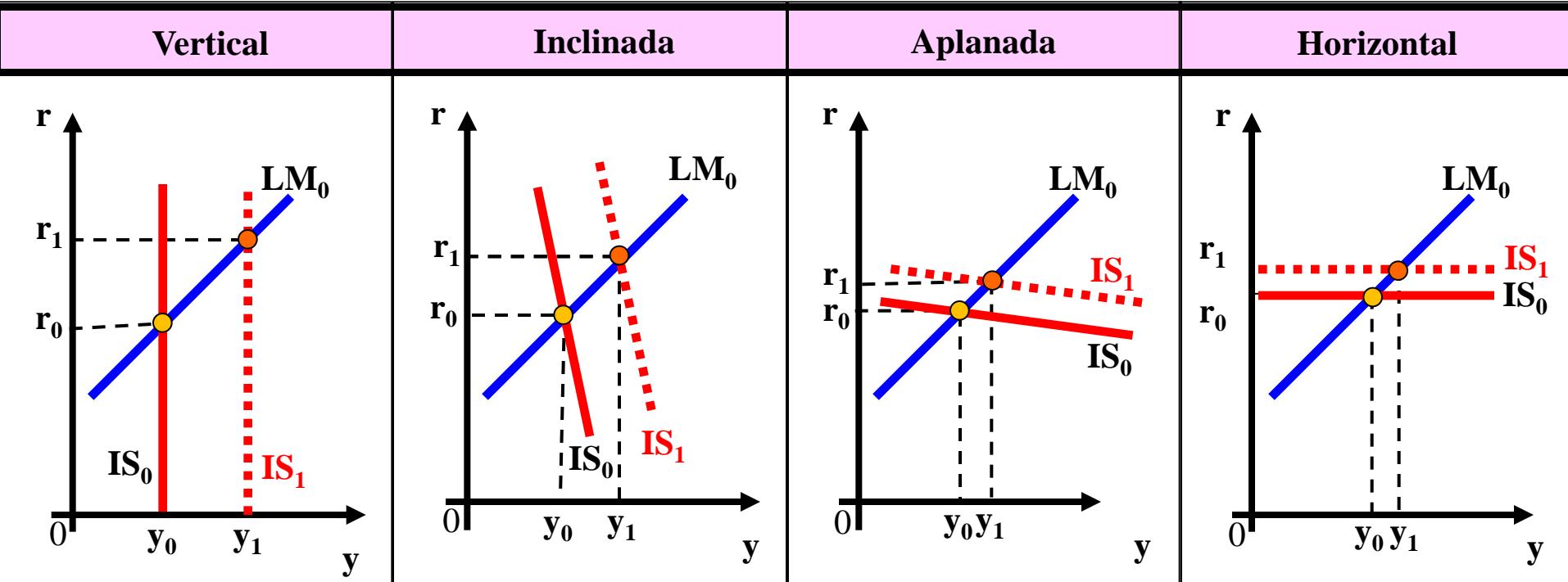


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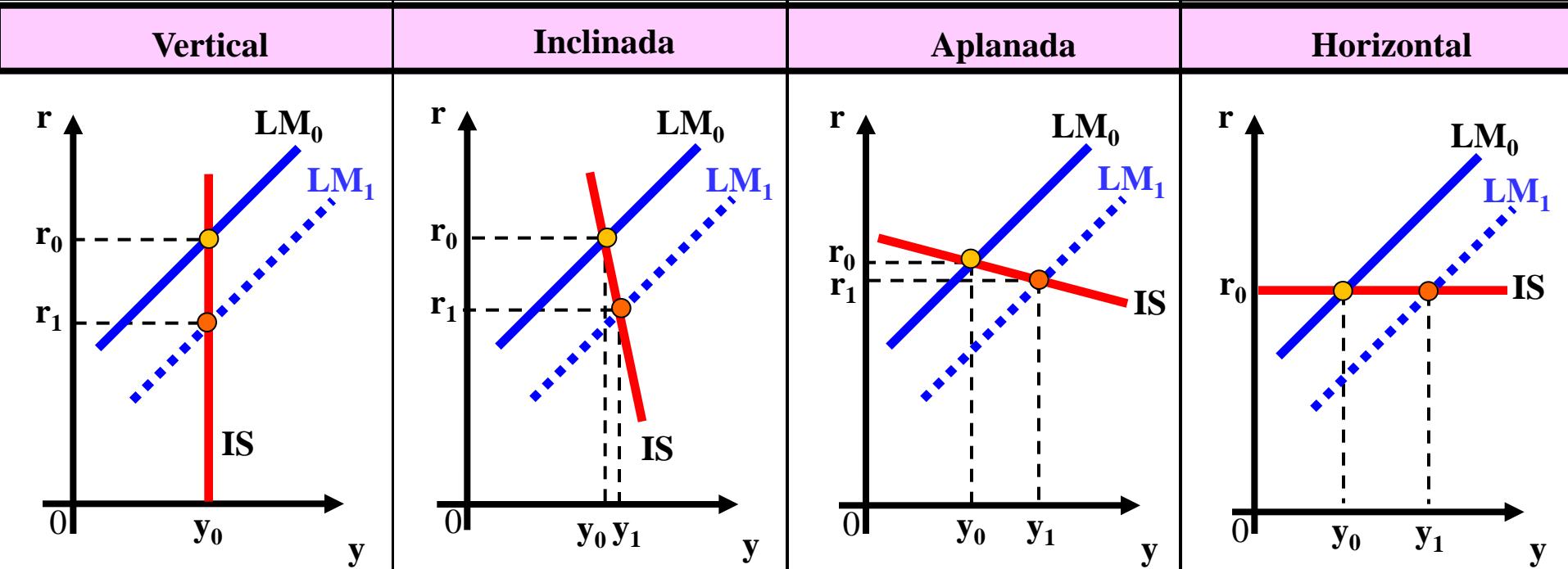
CURVA IS: eficacia de la política fiscal

	POLITICA	VARIABLE Y CARACTERISTICA	VERTICAL	INCLINADA	APLANADA	HORIZONTAL
IS	FISCAL	Δy	Muy grande ($y_1 - y_0 = \text{Pleno}$)	Grande ($y_1 - y_0$)	Pequeño ($y_1 - y_0$)	Muy pequeño ($y_1 - y_0 = \text{tiende a } 0$)
		Δr	Muy grande ($r_1 - r_0$)	Grande ($r_1 - r_0$)	Pequeño ($r_1 - r_0$)	Muy pequeño ($r_1 - r_0$)
	EFICACIA	Muy eficaz	Eficaz	Poco eficaz	Ineficaz	



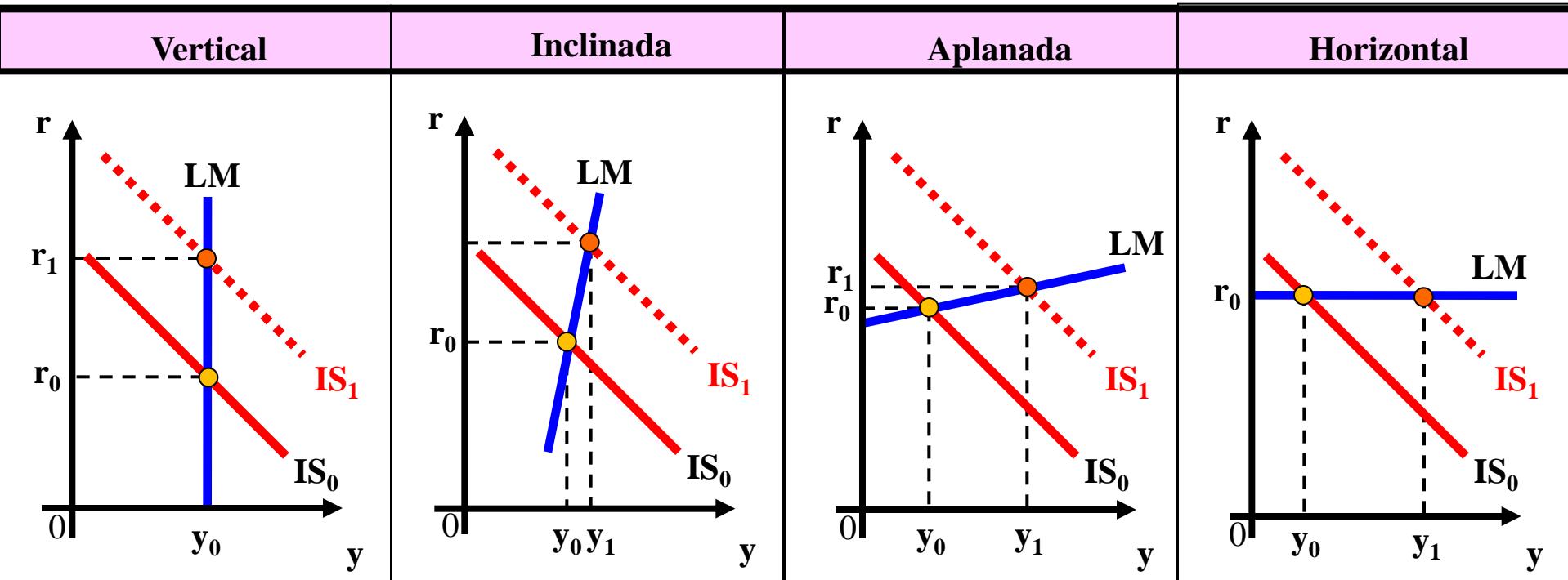
CURVA IS: eficacia de la política monetaria

	POLITICA	VARIABLE Y CARACTERISTICA	VERTICAL	INCLINADA	APLANADA	HORIZONTAL
IS MONETARIA	SENSIBILIDAD "I"	NULA SENSIBILIDAD DE "I"	BAJA SENSIBILIDAD DE I	ALTA SENSIBILIDAD DE I	COMPLETA SENSIBILIDAD DE "I"	
	Δy	Nulo ($y_1 - y_0 = 0$)	Pequeño ($y_1 - y_0$)	Grande ($y_1 - y_0$)	Muy grande ($y_1 - y_0$)	
	Δr	Muy grande ($r_0 - r_1 = \text{pleno}$)	Grande ($r_0 - r_1$)	Pequeña ($r_0 - r_1$)	Nula ($r_0 - r_1 = 0$)	
	ΔI	Nula	Baja	Alta	Muy Alta	
	EFICACIA	Ineficaz	Poco eficaz	Eficaz	Muy eficaz	



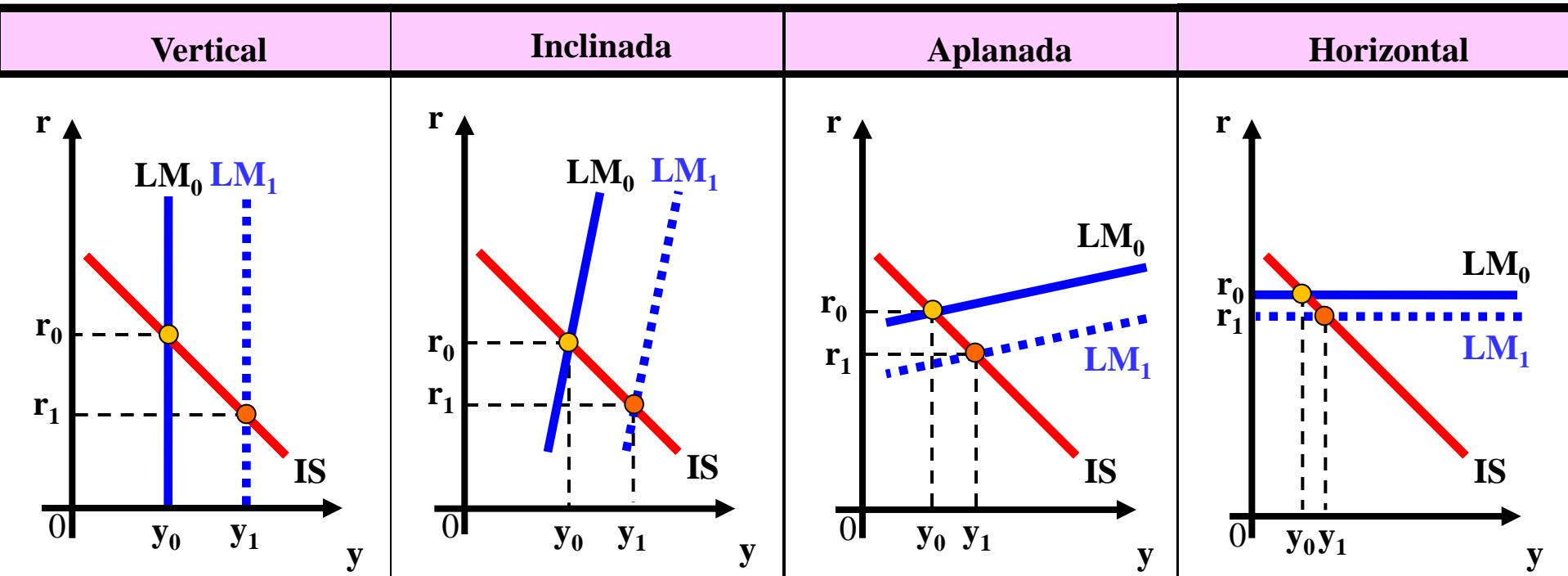
CURVA LM: eficacia de la política fiscal

	POLITICA	VARIABLE Y CARACTERISTICA	VERTICAL	INCLINADA	APLANADA	HORIZONTAL
LM FISCAL	SENSIBILIDAD “DEMANDA DE DINERO”	NULA SENSIBILIDAD	BAJA SENSIBILIDAD	ALTA SENSIBILIDAD	INFINITA SENSIBILIDAD	
	Δy	Nula ($y_1 - y_0 = 0$)	Pequeña ($y_1 - y_0$)	Grande ($y_1 - y_0$)	Grande ($y_1 - y_0$)	Muy grande ($y_1 - y_0 = \text{Pleno}$)
	Δr	Muy grande ($r_0 - r_1 = \text{Pleno}$)	Grande ($r_0 - r_1$)	Pequeña ($r_0 - r_1$)	Pequeña ($r_0 - r_1$)	Nula ($r_0 - r_1 = 0$)
EFICACIA		Ineficaz	Poco eficaz	Eficaz	Muy eficaz	



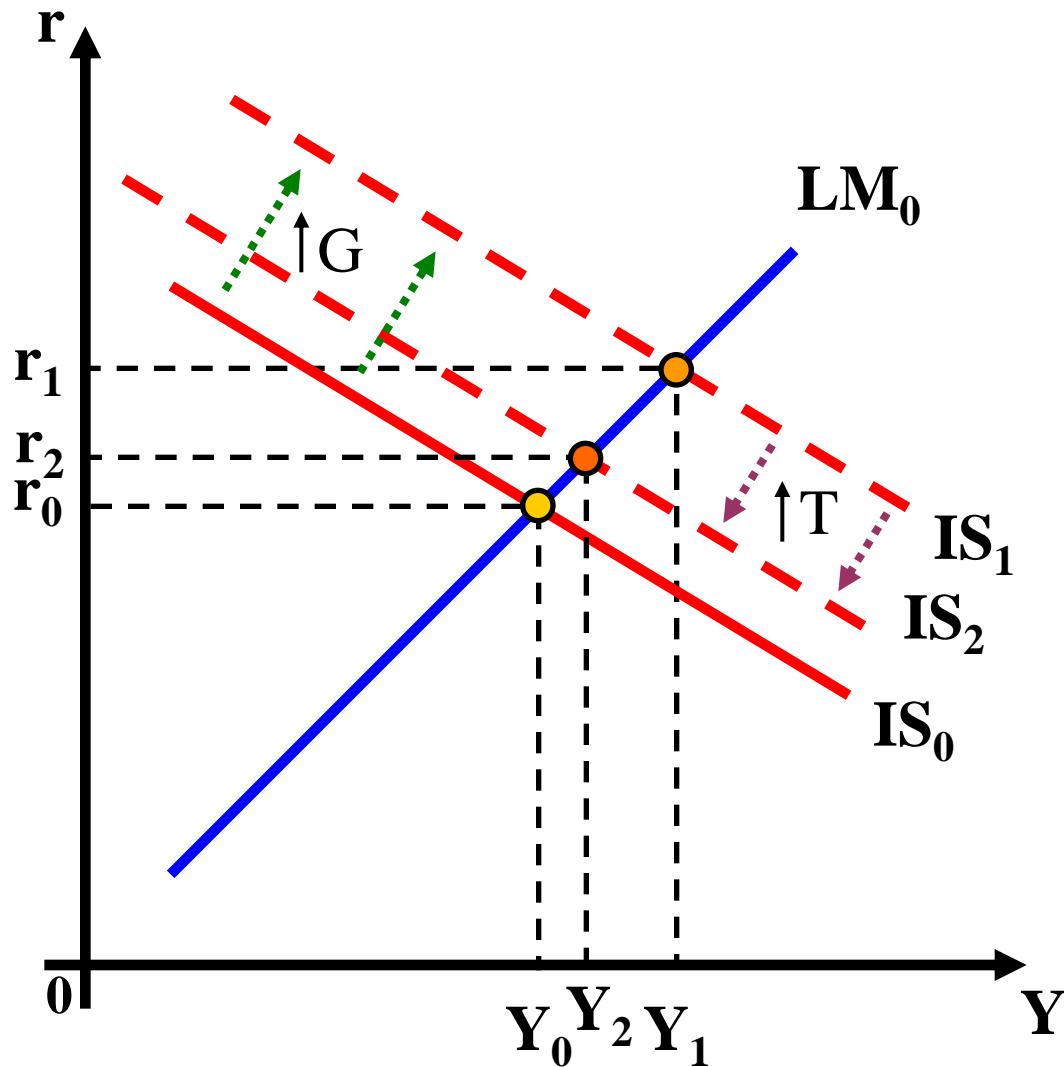
CURVA LM: eficacia de la política monetaria

	POLITICA	VARIABLE Y CARACTERISTICA	VERTICAL	INCLINADA	APLANADA	HORIZONTAL
LM MONETARIA	Δy	Muy grande ($y_1 - y_0 = \text{Pleno}$)	Grande ($y_1 - y_0$)	Pequeña ($y_1 - y_0$)	Muy pequeña ($y_1 - y_0 = \text{tiende a } 0$)	
	Δr	Muy grande ($r_1 - r_0$)	Grande ($r_1 - r_0$)	Pequeña ($r_1 - r_0$)	Muy pequeña ($r_1 - r_0 = \text{tiende a } 0$)	
	EFICACIA	Muy eficaz	Eficaz	Poco eficaz	Casi ineficaz	

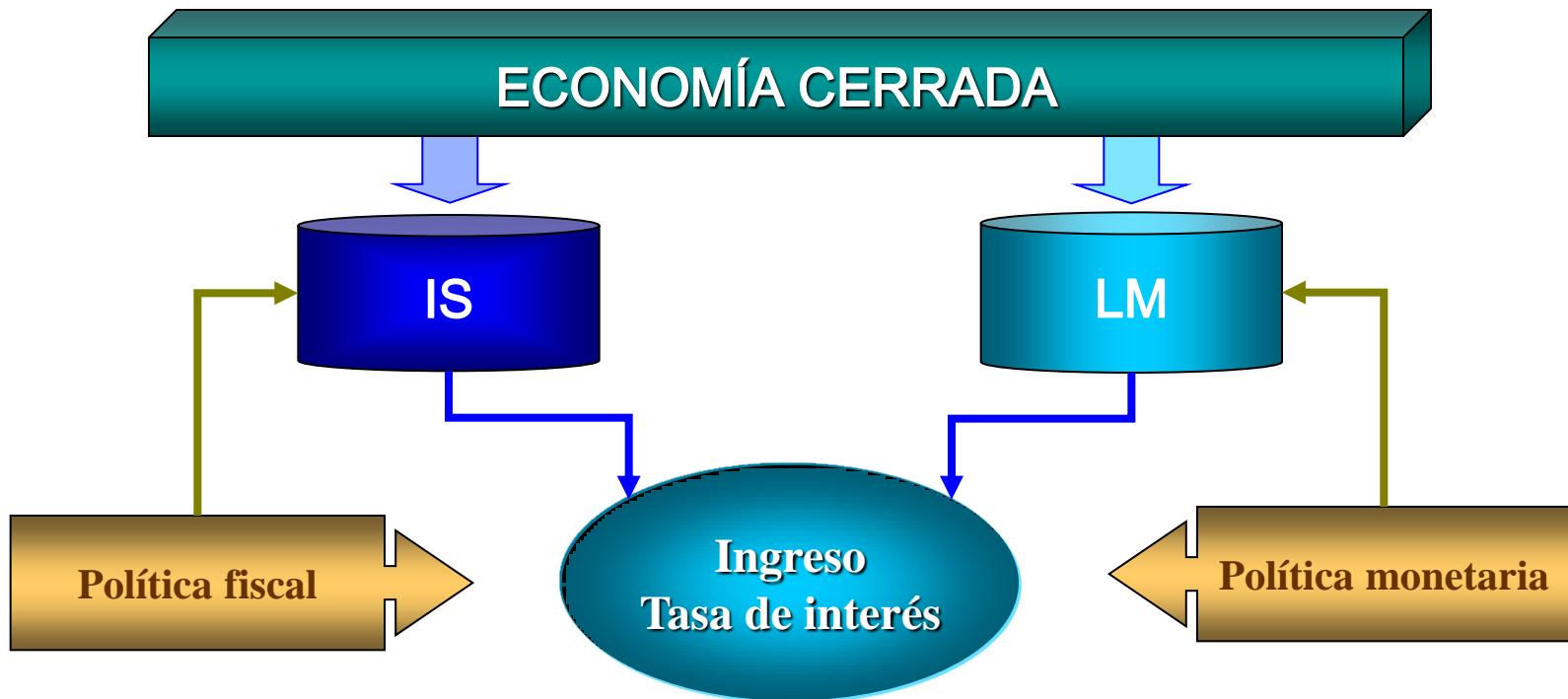


CURVA IS-LM

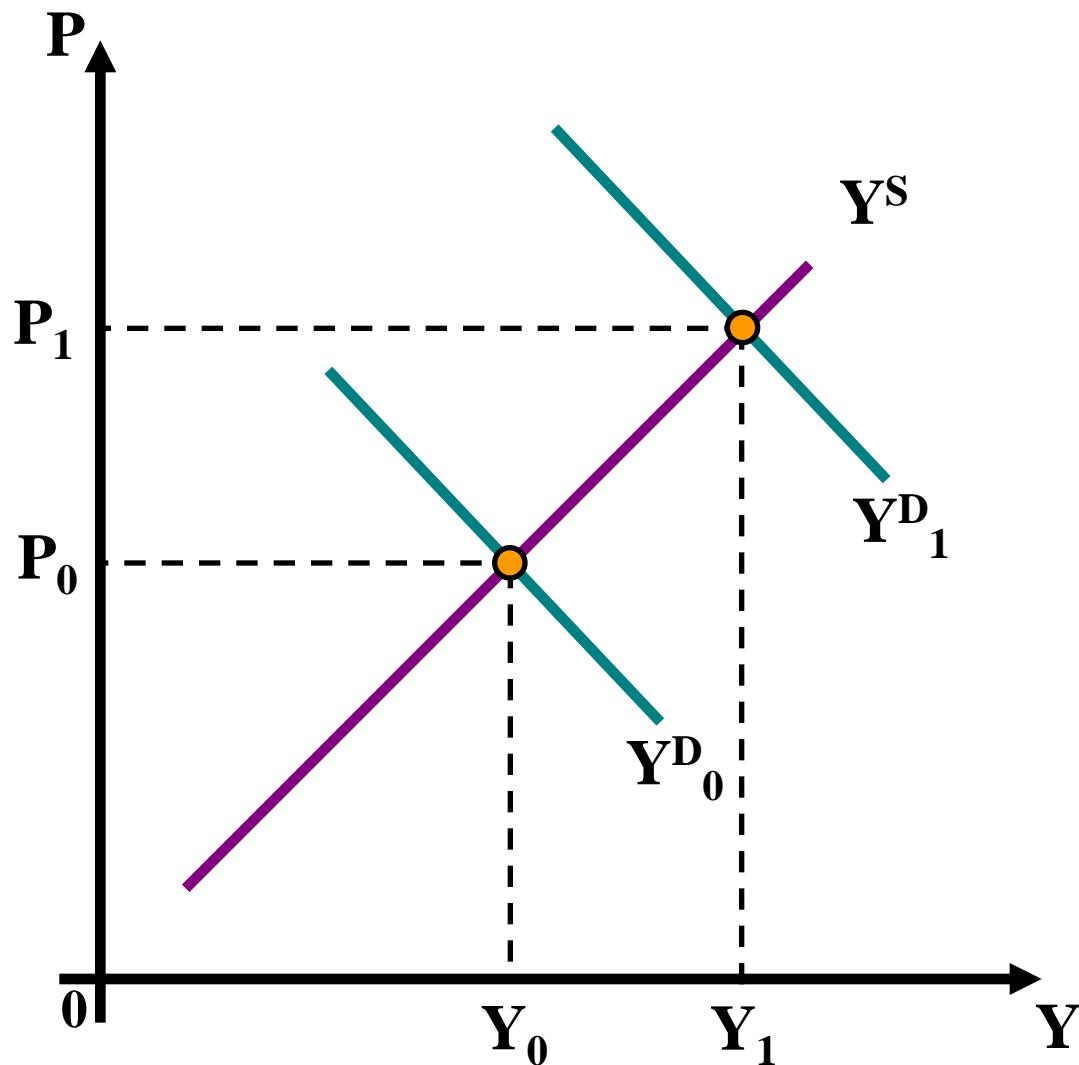
(política fiscal expansiva financiada con impuestos)



IS-LM: ECONOMÍA CERRADA CON GOBIERNO Y PRECIOS FLEXIBLES



DEMANDA Y OFERTA AGREGADA CON PRECIOS FLEXIBLES



EQUILIBRIO IS-LM, PRECIOS FLEXIBLES

$$PY = P(\beta_0 + \beta_1 Y - \beta_1 T_0 + \iota_0 - \iota_1 r + G_0)$$

$$Y = \left(\frac{1}{P(1-\beta_1)} \right) P(\beta_0 - \beta_1 T_0 + \iota_0 + G_0) - \frac{P(\iota_1)}{P(1-\beta_1)} r$$

$$Y = \left(\frac{1}{(1-\beta_1)} \right) (\beta_0 - \beta_1 T_0 + \iota_0 + G_0) - \frac{(\iota_1)}{(1-\beta_1)} r$$

$$PM^D = M^S = P\mu_0 + P\mu_1 Y - P\mu_2 r$$

$$LM = r = \frac{\mu_0 - M^S / P}{\mu_2} + \frac{\mu_1}{\mu_2} Y$$

$$Y^* = \frac{1}{P(1-\beta_1) + P(\iota_1) \frac{P\mu_1}{P\mu_2}} P(\beta_0 - \beta_1 T_0 + \iota_0 + G_0) - P(\iota_1) \left(\frac{P\mu_0}{P\mu_2} - \frac{M^s}{P\mu_2} \right)$$

$$r^* = \left[\frac{1}{P(1-\beta_1) + P(\iota_1) \frac{P\mu_1}{P\mu_2}} \right] P(1-\beta_1) \frac{P\mu_0 - M^s}{P\mu_2} + \frac{P\mu_1}{P\mu_2} (P\beta_0 - P\beta_1 T_0 + P\iota_0 + PG_0)$$

EQUILIBRIO IS-LM, PRECIOS FLEXIBLES

$$Y^* = \left(\frac{1}{P(1-\beta_1) + P(\iota_1) \frac{P\mu_1}{P\mu_2}} \right) \left(P(\beta_0 - \beta_1 T_0 + \iota_0 + G_0) - P(\iota_1) \left(\frac{P\mu_0}{P\mu_2} - \frac{M^s}{P\mu_2} \right) \right)$$

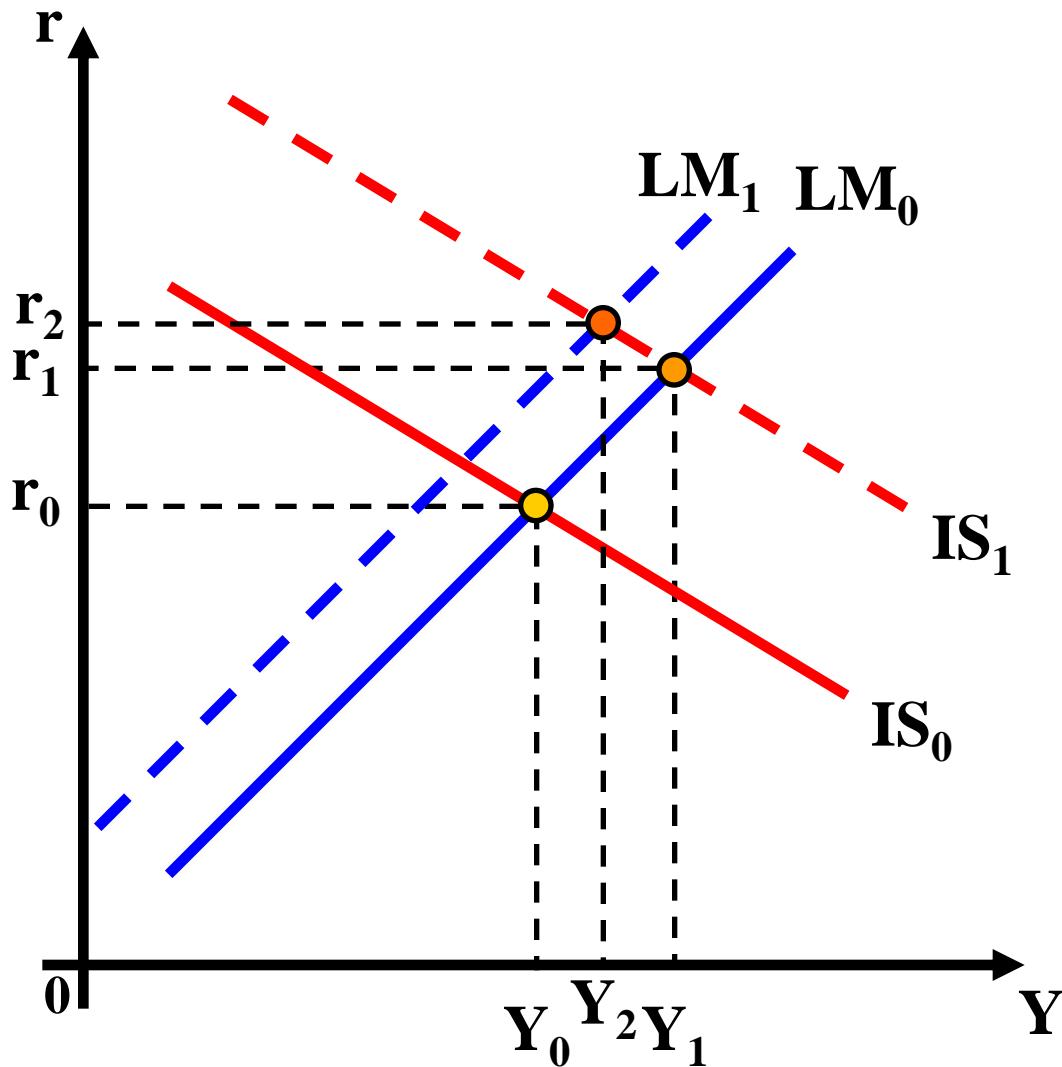
$$Y^* = \left(\frac{1}{(1-\beta_1) + (\iota_1) \frac{\mu_1}{\mu_2}} \right) \left((\beta_0 - \beta_1 T_0 + \iota_0 + G_0) - (\iota_1) \left(\frac{\mu_0}{\mu_2} - \frac{M^s}{\mu_2} \right) \right)$$

$$r^* = \left[\frac{1}{P(1-\beta_1) + P(\iota_1) \frac{P\mu_1}{P\mu_2}} \right] P(1-\beta_1) \frac{P\mu_0 - M^s}{P\mu_2} + \frac{P\mu_1}{P\mu_2} (P\beta_0 - P\beta_1 T_0 + P\iota_0 + PG_0)$$

$$r^* = \left[\frac{1}{(1-\beta_1) + (\iota_1) \frac{\mu_1}{\mu_2}} \right] (1-\beta_1) \frac{\mu_0 - M^s / P}{\mu_2} + \frac{\mu_1}{\mu_2} (\beta_0 - \beta_1 T_0 + \iota_0 + G_0)$$

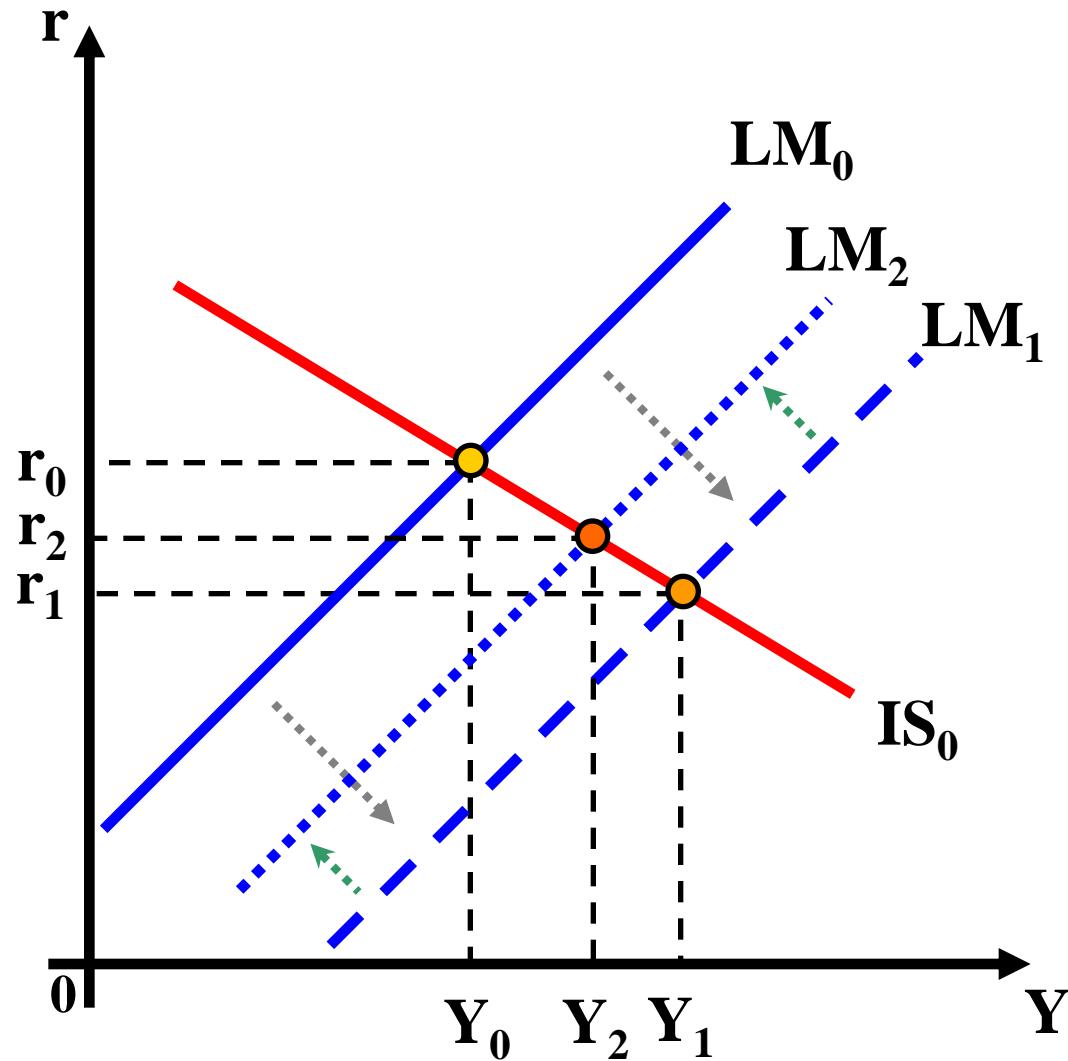
CURVA IS-LM

(política fiscal con precios flexibles)



CURVA IS-LM

(política monetaria con precios flexibles)



IS-LM: SISTEMA CLÁSICO Y KEYNESIANO

SISTEMA KEYNESIANO		SISTEMA CLÁSICO	
Política Monetaria (ΔM^s)	Política Fiscal (ΔG)	Política Fiscal (ΔG)	Política Monetaria (ΔM^s)
Política Monetaria INEFICAZ		Política Monetaria INEFICAZ	
Política fiscal MUY EFICAZ		Política Fiscal INEFICAZ	

Efecto en precios: poco perceptible

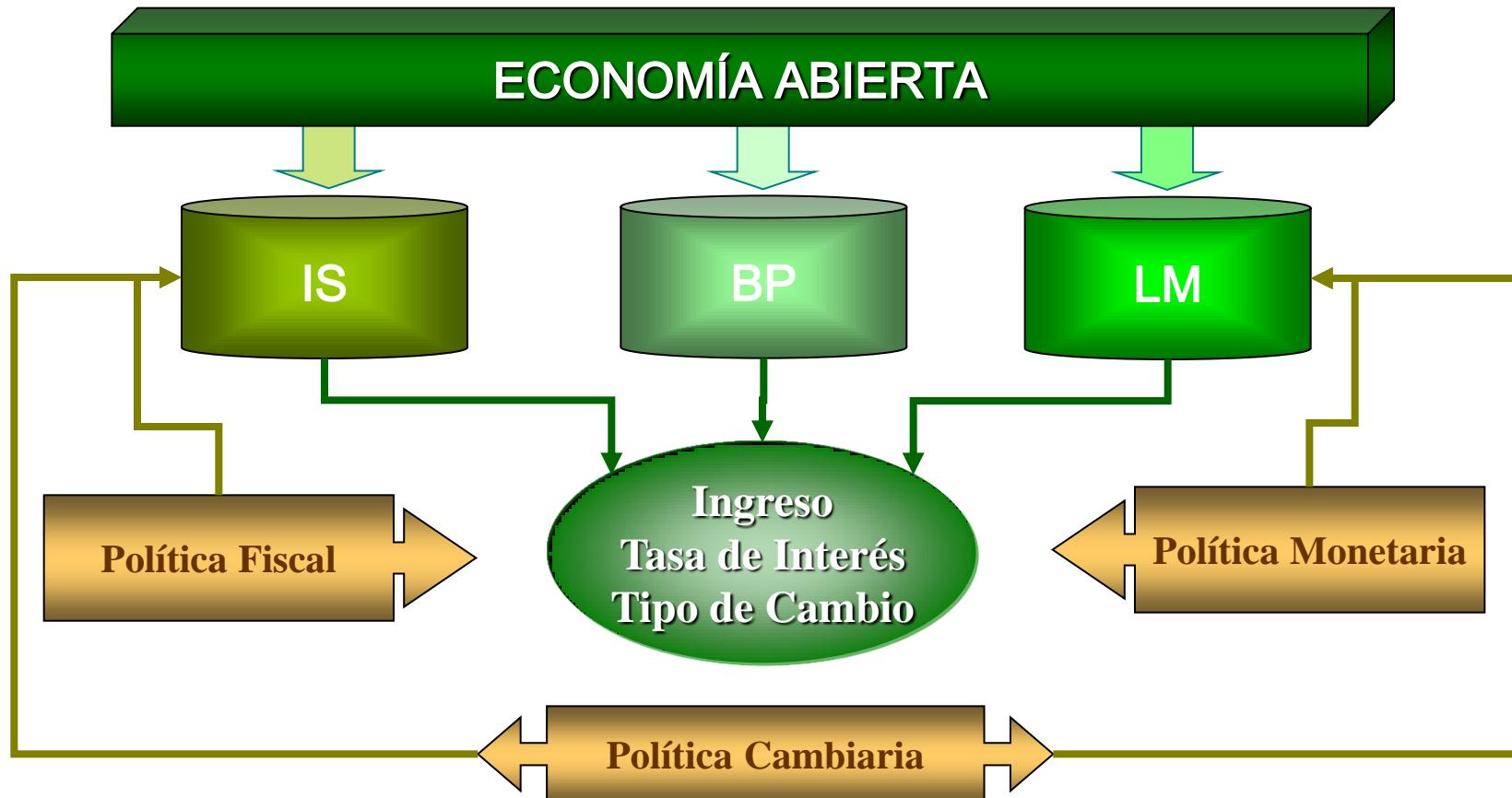
Efecto en precios: $(\Delta \alpha \%) P = ((\Delta \alpha \%) M) / k_y$

IS-LM: SISTEMA MONETARISTA

SISTEMA MONETARISTA		
Política Fiscal (ΔG)	Política Monetaria (ΔM^s)	Política Monetaria ($\Delta M^s = \alpha\%$)
<p>Graph showing the effect of a fiscal expansion (ΔG). The vertical axis is interest rate (r) and the horizontal axis is output (y). An upward-sloping LM curve (LM_0) intersects a downward-sloping IS curve (IS_0) at point (y_0, r_0). A second IS curve (IS_1) is parallel to the first and shifted to the right. The new equilibrium is at point (y_1, r_1).</p>	<p>Graph showing the effect of an increase in money supply (ΔM^s). The vertical axis is interest rate (r) and the horizontal axis is output (y). An upward-sloping LM curve (LM_0) intersects a downward-sloping IS curve (IS_0) at point (y_0, r_0). A second LM curve (LM_1) is parallel to the first and shifted to the right. The new equilibrium is at point (y_1, r_1).</p>	<p>Graph showing the effect of a monetary policy with a fixed interest rate target ($\Delta M^s = \alpha\%$). The vertical axis is interest rate (r) and the horizontal axis is output (y). A vertical LM curve (LM_t) intersects a downward-sloping IS curve (IS_0) at point (y_0, r_0). A second IS curve ($IS_{1(\text{choques})}$) is parallel to the first and shifted to the right. The new equilibrium is at point (y_1, r_1).</p>
Política Monetaria MUY EFICAZ, pero opera con rezagos; no se recomienda		
Política Fiscal POCA EFICACIA		

Efecto en precios: $(\Delta\alpha\%)P = ((\Delta\alpha\%)M)/ky$

IS-LM-BP: ECONOMÍA ABIERTA CON GOBIERNO Y PRECIOS RÍGIDOS



MODELO IS-LM-BP

NOMBRE	FUNCIÓN PARAMÉTRICA	PARÁMETROS
Función consumo	$C = \beta_0 + \beta_1 Y - \beta_1 T_0$	$\beta_0 > 0, \quad 0 < \beta_1 < 1; \quad T_0 \geq 0$
Función inversión	$I = \iota_0 - \iota_1 r$	$\iota_0, \iota_1 > 0$
Función gasto de gobierno	$G = G_0$	$G_0 \geq 0$
Función exportaciones	$X = \xi_0 + \xi_1 Y^{RM} + \xi_2 Tc$	$\xi_1, \xi_2, \xi_3 > 0$
Función importaciones	$Q = \theta_0 + \theta_1 Y - \theta_2 Tc$	$\theta_0, \theta_2 > 0; \quad s\theta_1 \in (0,1) < \beta_1$

NOMBRE	FUNCIÓN PARAMÉTRICA	PARÁMETROS
Oferta de dinero	$M^S = \mu(CIN + RI)$	$\mu > 0; \quad CIN > 0; \quad RI > 0$
Función demanda de dinero	$M^D = \mu_0 + \mu_1 Y - \mu_2 r$	$\mu_0 > 0; \quad \mu_1 > 0; \quad \mu_2 > 0$

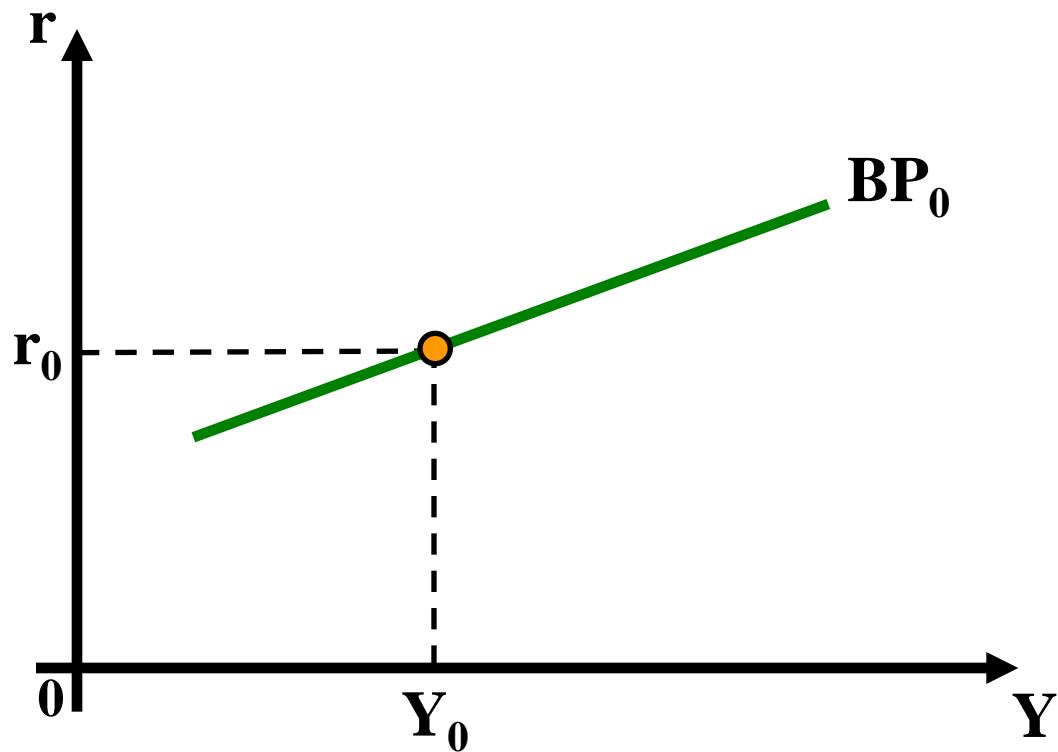
NOMBRE	FUNCIÓN PARAMÉTRICA	PARÁMETROS
Balanza de pagos	$X - Q = -IEN$ $X - Q + IEN = 0$	
Función exportaciones	$X = \xi_0 + \xi_1 Y^{RM} + \xi_2 Tc$	$\xi_1, \xi_2, \xi_3 > 0$
Función importaciones	$Q = \theta_0 + \theta_1 Y - \theta_2 Tc$	$\theta_0, \theta_2 > 0; \quad 0 < \theta_1 < 1$
Función inversión exterior neta	$IEN = \rho_0(r - r^{RM})$	$\rho_0 \geq 0$

MODELO IS-LM-BP

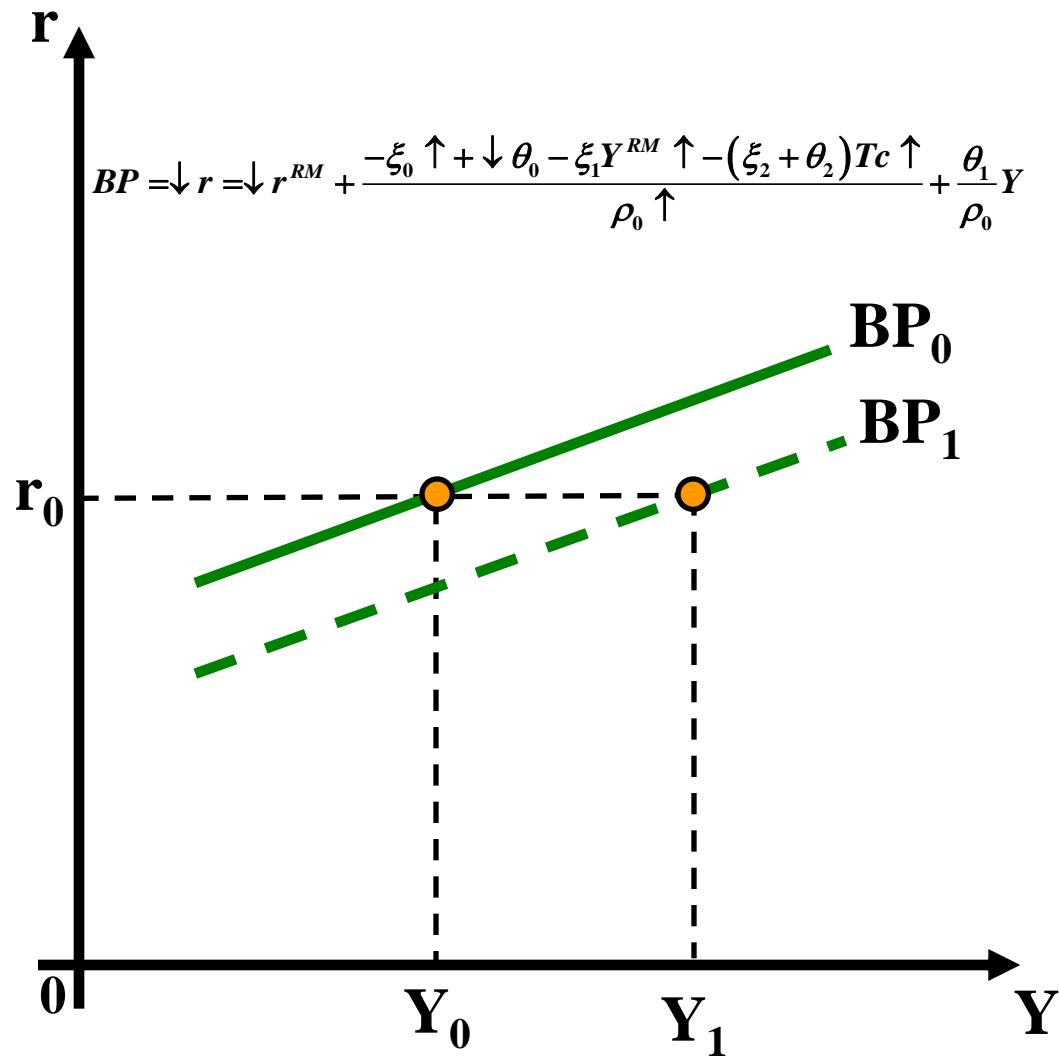
$$\left(\begin{array}{ccc|c} BY & \iota_1 r & 0 & A \\ -\theta_1 Y & \rho_0 r & 0 & F \\ -EY & \mu_2 r & \mu RI & D \end{array} \right) = \left[\begin{array}{ccc} B & \iota_1 & 0 \\ -\theta_1 & \rho_0 & 0 \\ -E & \mu_2 & \mu \end{array} \right] \left[\begin{array}{c} Y \\ r \\ RI \end{array} \right] = \left[\begin{array}{c} A \\ F \\ D \end{array} \right]$$

$$\left(\begin{array}{ccc|c} 1 & 0 & 0 & \frac{A}{B} - \frac{\iota_1}{B} \left(\frac{F + \frac{A}{B} \theta_1}{\rho_0 + \frac{\iota_1}{B} \theta_1} \right) \\ 0 & 1 & 0 & \left(\frac{F + \frac{A}{B} \theta_1}{\rho_0 + \frac{\iota_1}{B} \theta_1} \right) \\ 0 & 0 & 1 & \left(D + \frac{A}{B} E \right) - \left(\mu_2 + \frac{\iota_1}{B} E \right) \left(\frac{F + \frac{A}{B} \theta_1}{\rho_0 + \frac{\iota_1}{B} \theta_1} \right) \end{array} \right)$$

CURVA BP

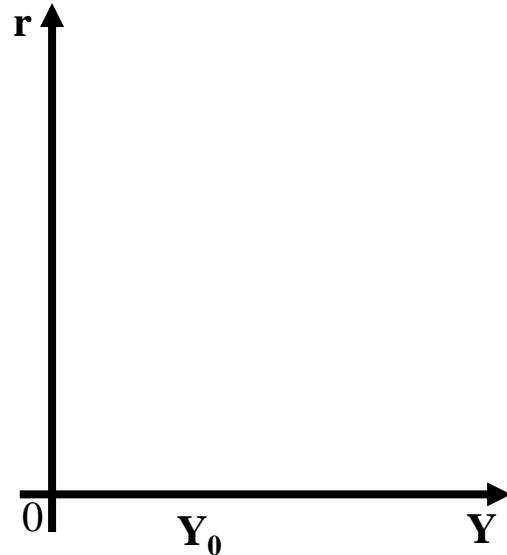


CURVA BP

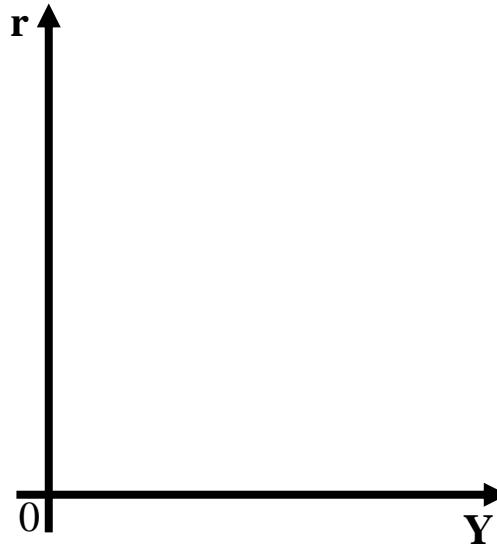


IS-LM-BP:

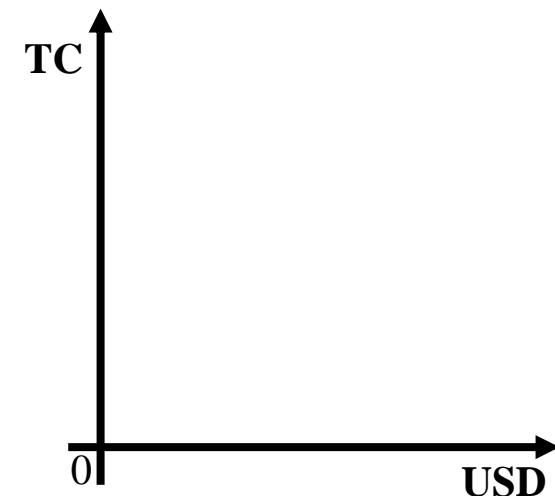
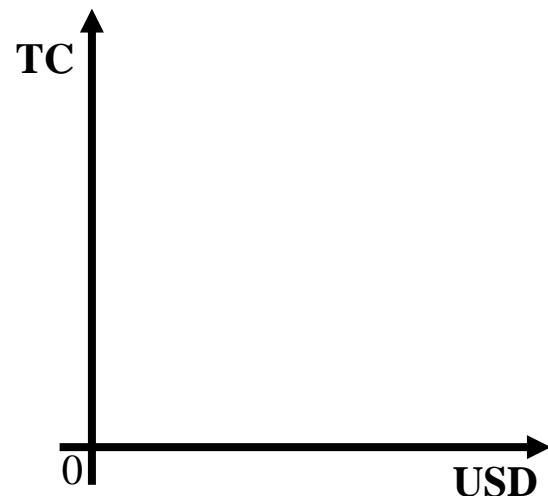
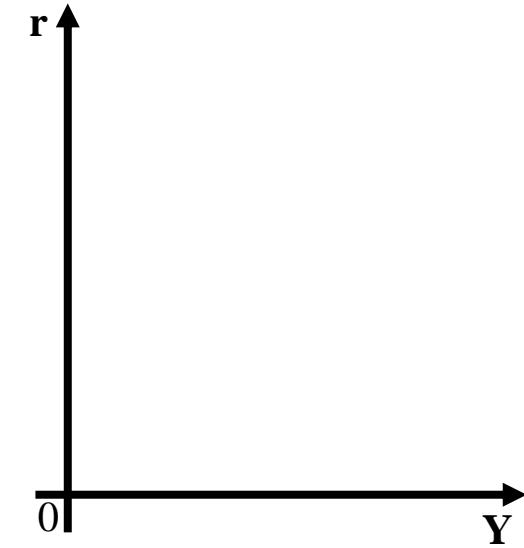
Perfecta movilidad de capitales



Imperfecta movilidad de capitales

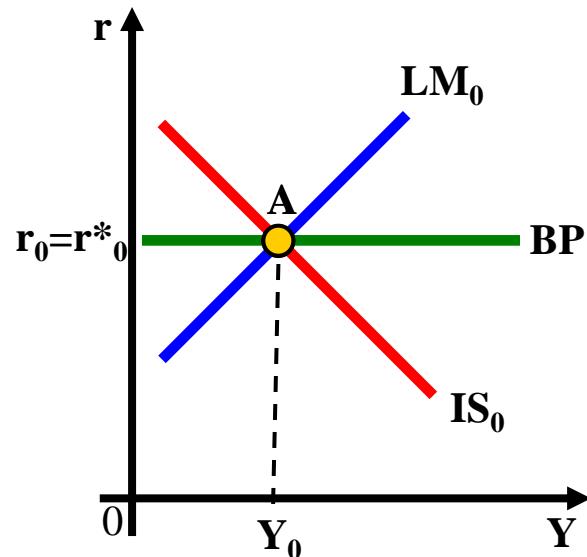


Perfecta inmovilidad de capitales

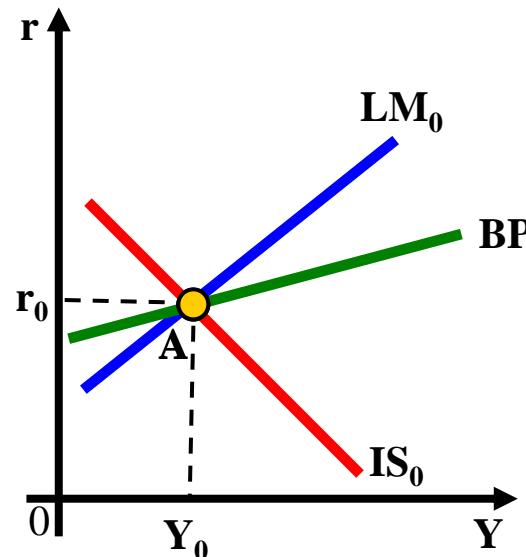


IS-LM-BP: POLÍTICA ECONÓMICA

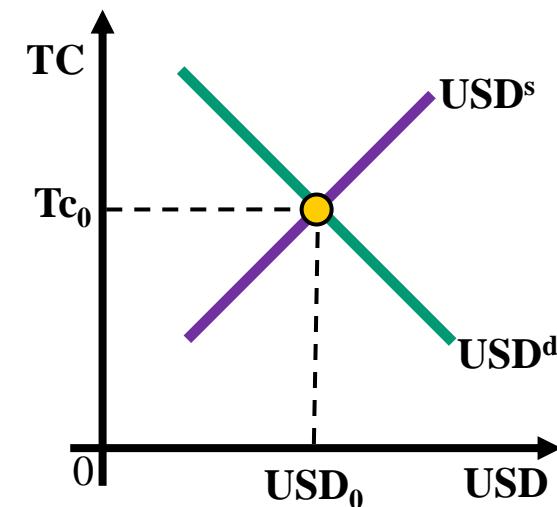
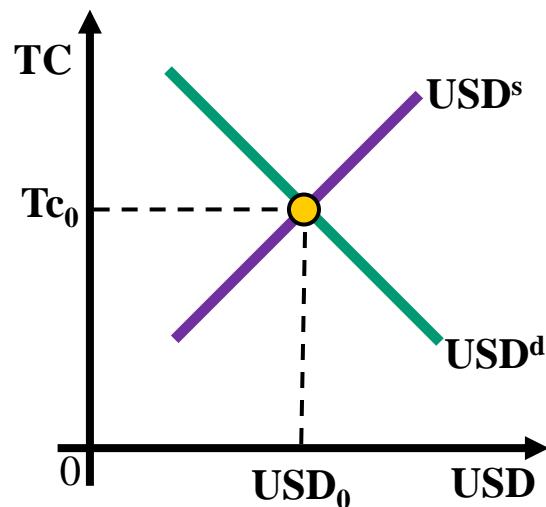
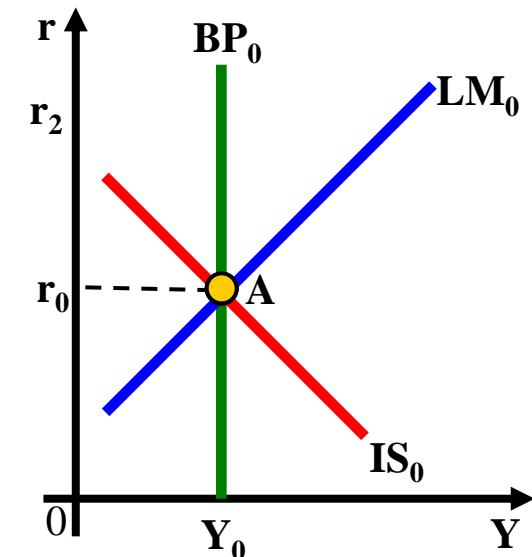
Perfecta movilidad de capitales



Imperfecta movilidad de capitales



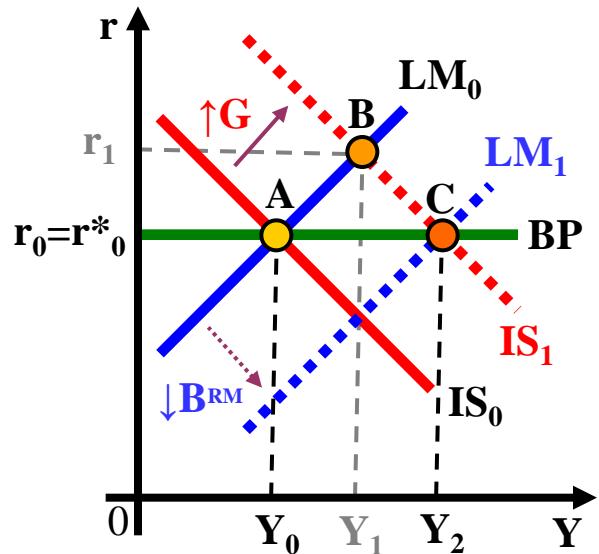
Perfecta inmovilidad de capitales



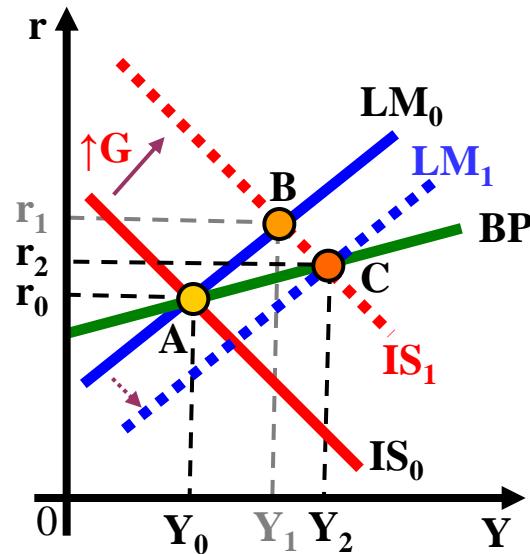
Curva BP: política fiscal con tipo de cambio fijo

	POLITICA	VARIABLE Y CARACTERISTICA	HORIZONTAL	INCLINADA	VERTICAL
BP FISCAL (Tipo de Cambio Fijo)	ΔY	Muy Grande ($Y_0 < Y_2$)	Grande ($Y_0 < Y_2$)	Transitoria ($Y_0 = Y_2 < Y_1$)	
	Δr	Nulo ($\Delta r = 0$)	Pequeño ($r_0 < r_2$)	Grande ($r_0 < r_2$)	
	ΔTc	Fijo ($\Delta Tc = 0$)	Fijo ($\Delta Tc = 0$)	Fijo ($\Delta Tc = 0$)	
	EFICACIA	Muy eficaz	Eficaz	Ineficaz	

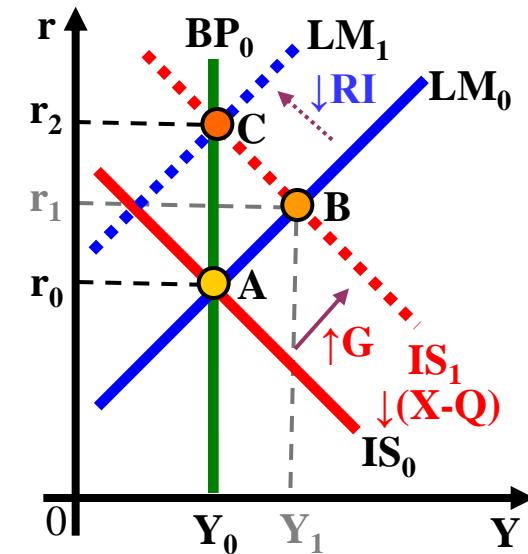
Horizontal



Inclinada



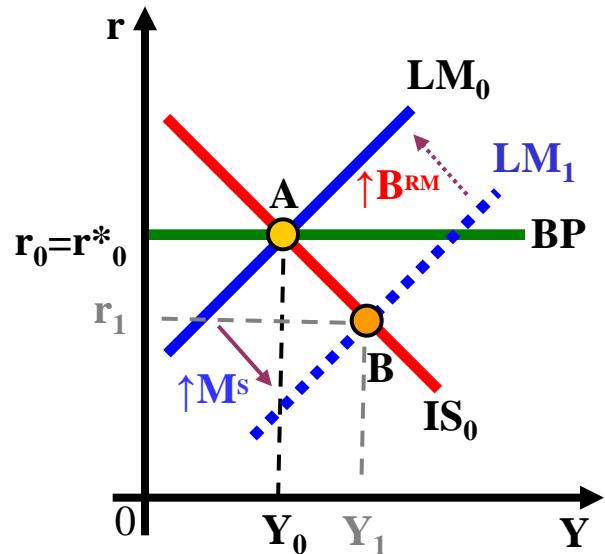
Vertical



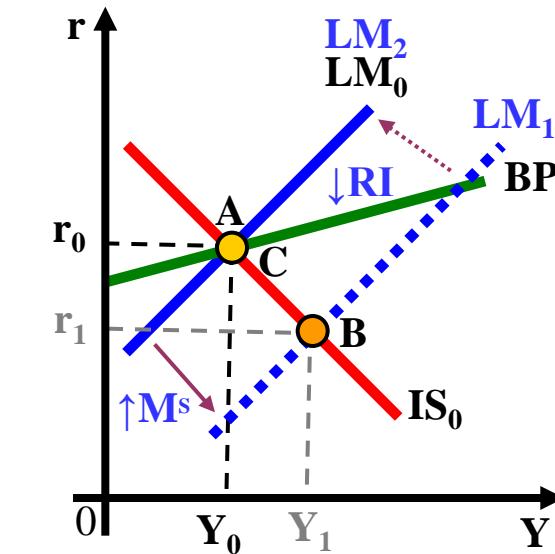
Curva BP: pol. monetaria, tipo de cambio fijo

	POLITICA	VARIABLE Y CARACTERISTICA	HORIZONTAL	INCLINADA	VERTICAL
BP MONETARIA (Tipo de Cambio Fijo)	ΔY	Nula ($Y_0 = Y_2$)	Pequeña ($Y_0 < Y_1$)	Transitoria ($Y_0 = Y_2 < Y_1$)	
	Δr	Nula ($r_0 = r^{RM}$)	Grande ($r_0 > r_1$)	Transitoria ($r_0 = r_2 < r_1$)	
	ΔTc	Fijo ($\Delta Tc = 0$)	Fijo ($\Delta Tc = 0$)	Fijo ($\Delta Tc = 0$)	
	EFICACIA	Ineficaz	Ineficaz	Poco eficaz y transitoria	

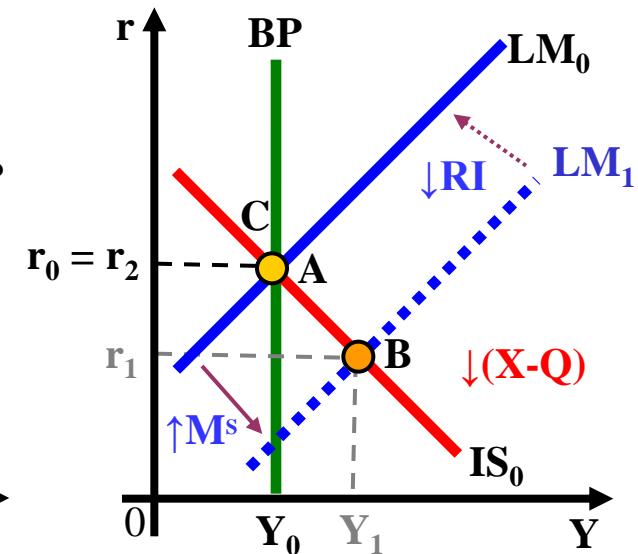
Horizontal



Inclinada



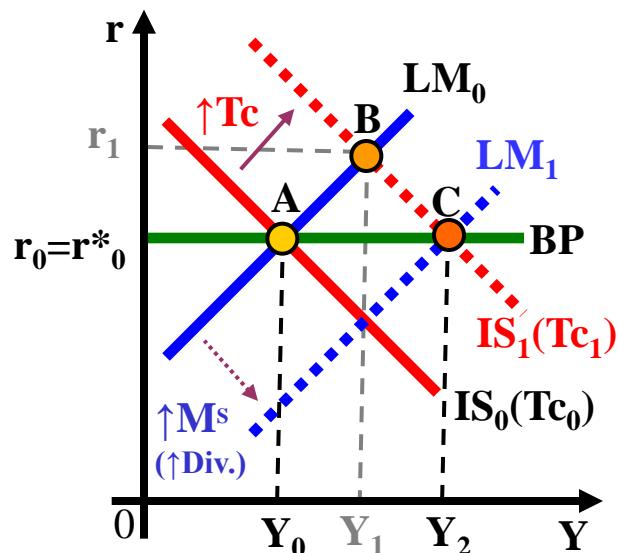
Vertical



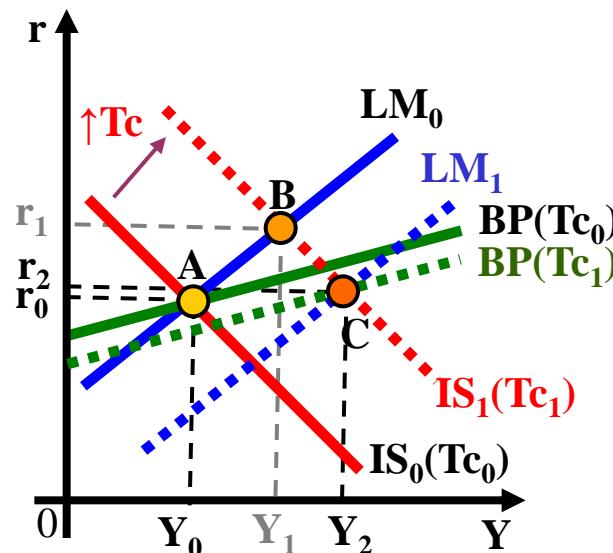
Curva BP: pol. cambiaria, tipo de cambio fijo

	POLITICA	VARIABLE Y CARACTERISTICA	HORIZONTAL	INCLINADA	VERTICAL
BP CAMBIARIA (Tipo de Cambio Fijo)	ΔY	Muy Grande ($Y_0 < Y_1 < Y_2$)	Grande ($y_1 - y_0$)	Muy Grande ($Y_0 < Y_1$)	
	Δr	Nulo ($r_1 = r^{RM}$)	Grande ($r_1 - r_0$)	Nulo (r_0)	
	ΔTc	Devaluación ($Tc_0 < Tc_1$)	Devaluación ($Tc_0 < Tc_1$)	Devaluación ($Tc_0 < Tc_1$)	
	EFICACIA	Muy eficaz	Eficaz	Muy eficaz	

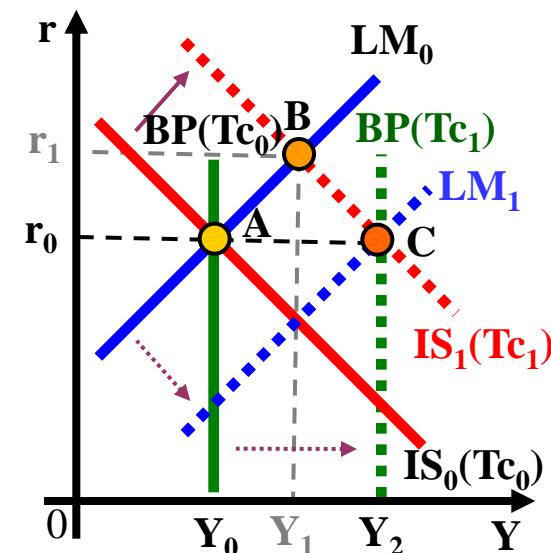
Horizontal



Inclinada



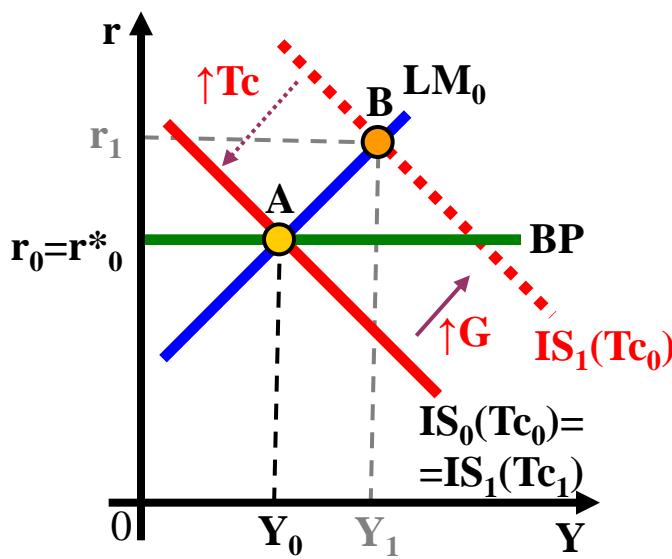
Vertical



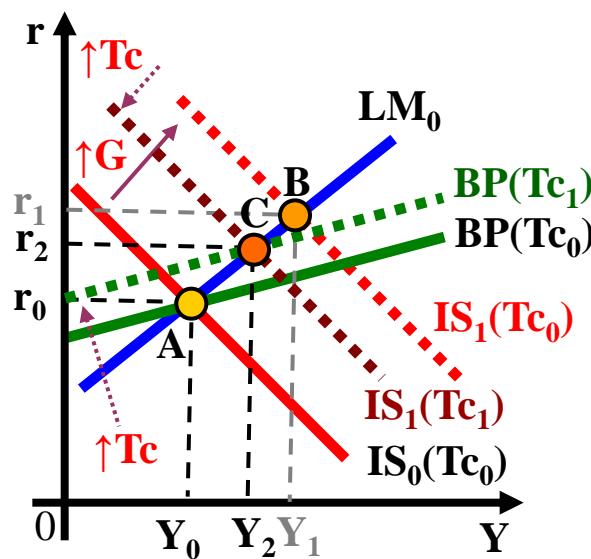
CURVA BP: pol. fiscal, tipo de cambio flexible

POLITICA	VARIABLE Y CARACTERISTICA	HORIZONTAL	INCLINADA	VERTICAL
BP FISCAL (Tipo de Cambio Flexible)	ΔY	Nula ($Y_0 < Y_2$)	Mediana ($Y_0 < Y_1 > Y_2$)	Alta ($Y_0 < Y_1 < Y_2$)
	Δr	Nula ($r_1 = r^{RM}$)	Mediana ($r_0 < r_1 > r_2$)	Alta ($r_0 < r_1 < r_2$)
	ΔTc	Apreciación ($Tc_0 > Tc_1$)	Apreciación ($Tc_0 > Tc_1$)	Depreciación ($Tc_0 < Tc_1$)
	EFICACIA	Ineficaz	Eficaz	Muy Eficaz

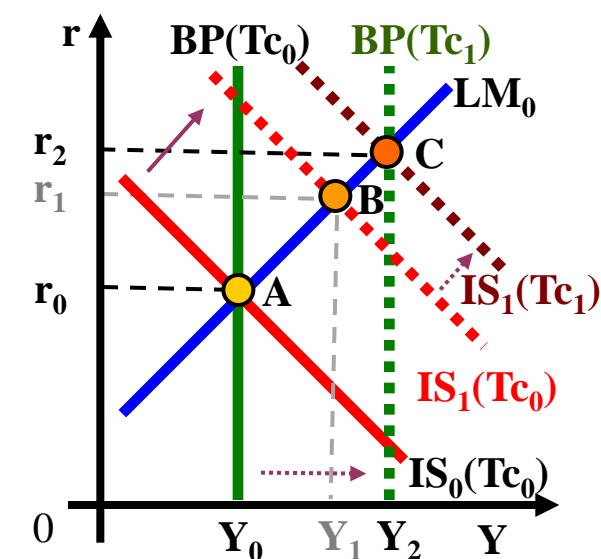
Horizontal



Inclinada



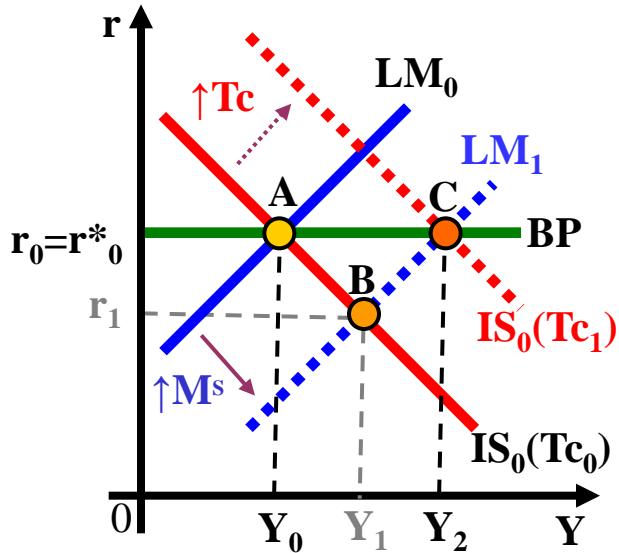
Vertical



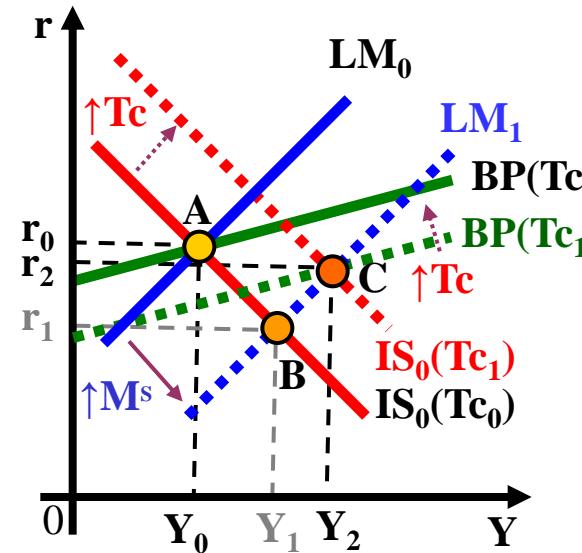
CURVA BP: pol. monetaria, paridad flexible

	POLITICA	VARIABLE Y CARACTERISTICA	HORIZONTAL	INCLINADA	VERTICAL
BP MONETARIA (Tipo de Cambio Flexible)	ΔY	Muy Grande ($Y_0 < Y_1 < Y_2$)	Grande ($Y_0 < Y_1 > Y_2$)	Muy Grande ($Y_0 < Y_1 < Y_2$)	
	Δr	Nula ($r_1 = r^{RM}$)	Grande ($r_0 > r_1 < r_2$)	Grande ($r_0 > r_1 > r_2$)	
	ΔTc	Depreciación ($Tc_0 < Tc_1$)	Depreciación ($Tc_0 < Tc_1$)	Depreciación ($Tc_0 < Tc_1$)	
	EFICACIA	Muy eficaz	Eficaz	Muy Eficaz	

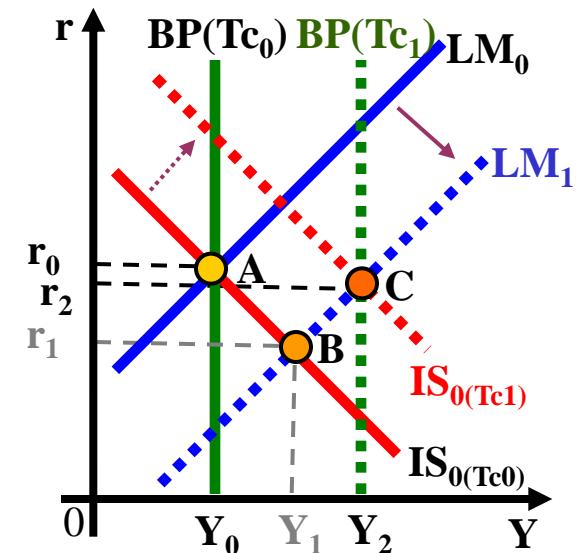
Horizontal



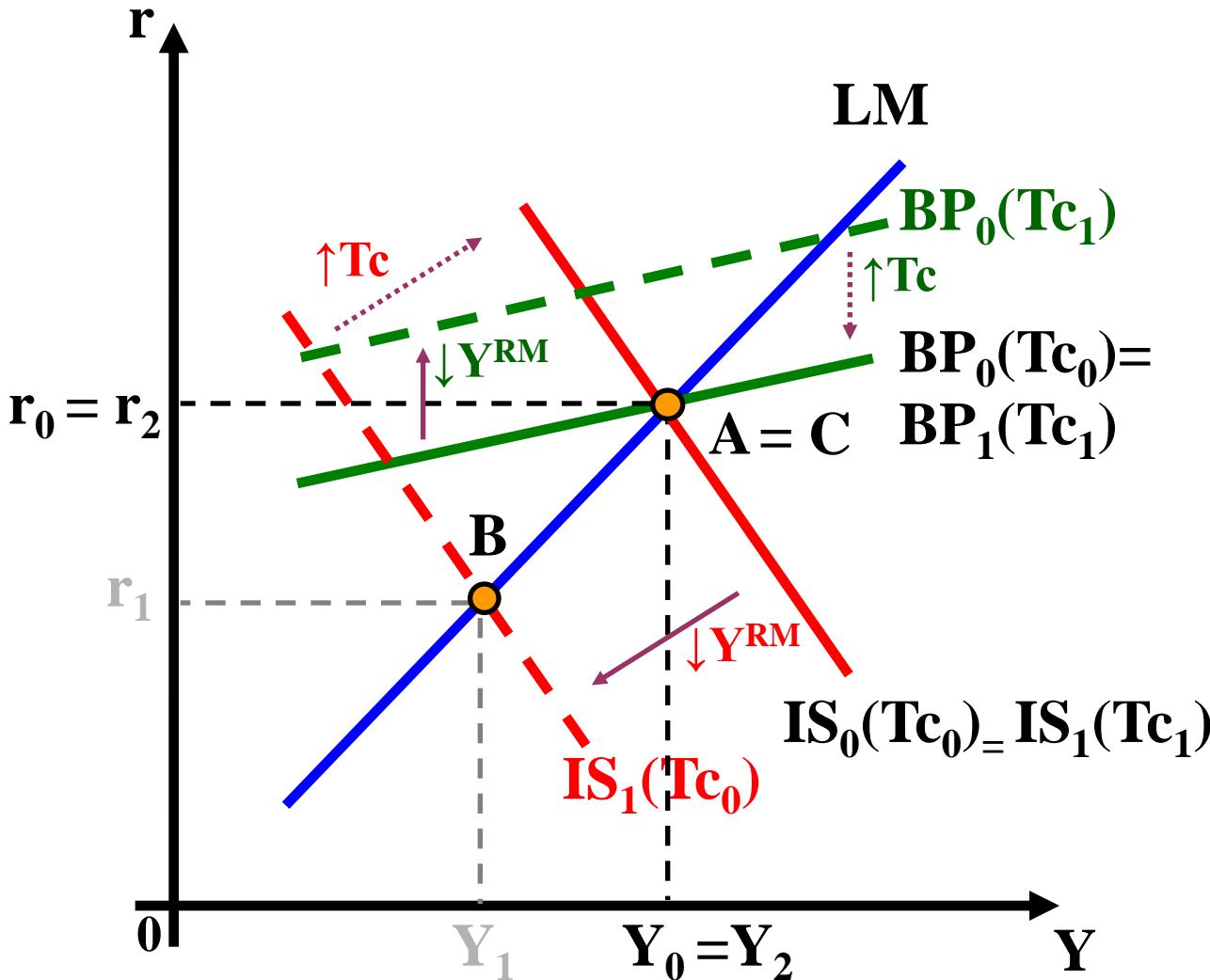
Inclinada



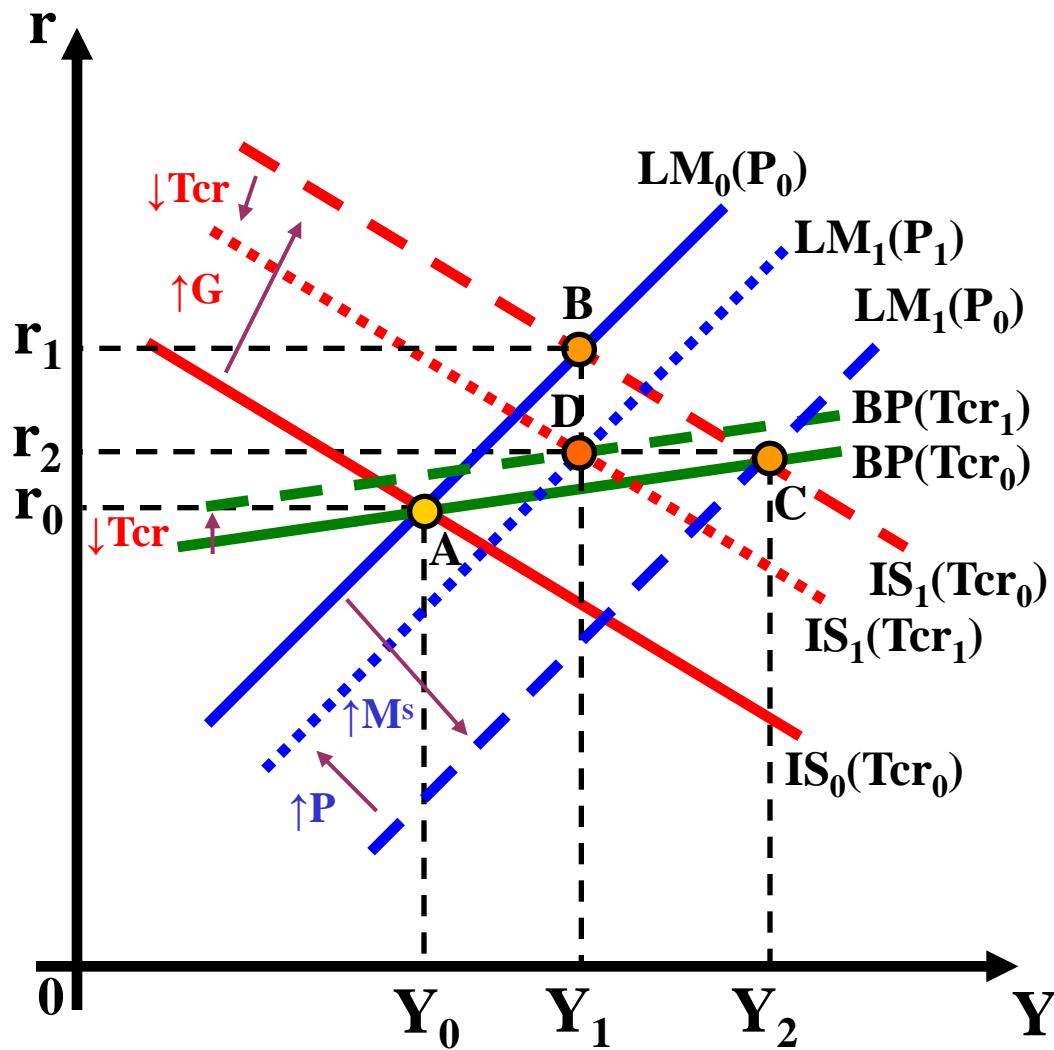
Vertical



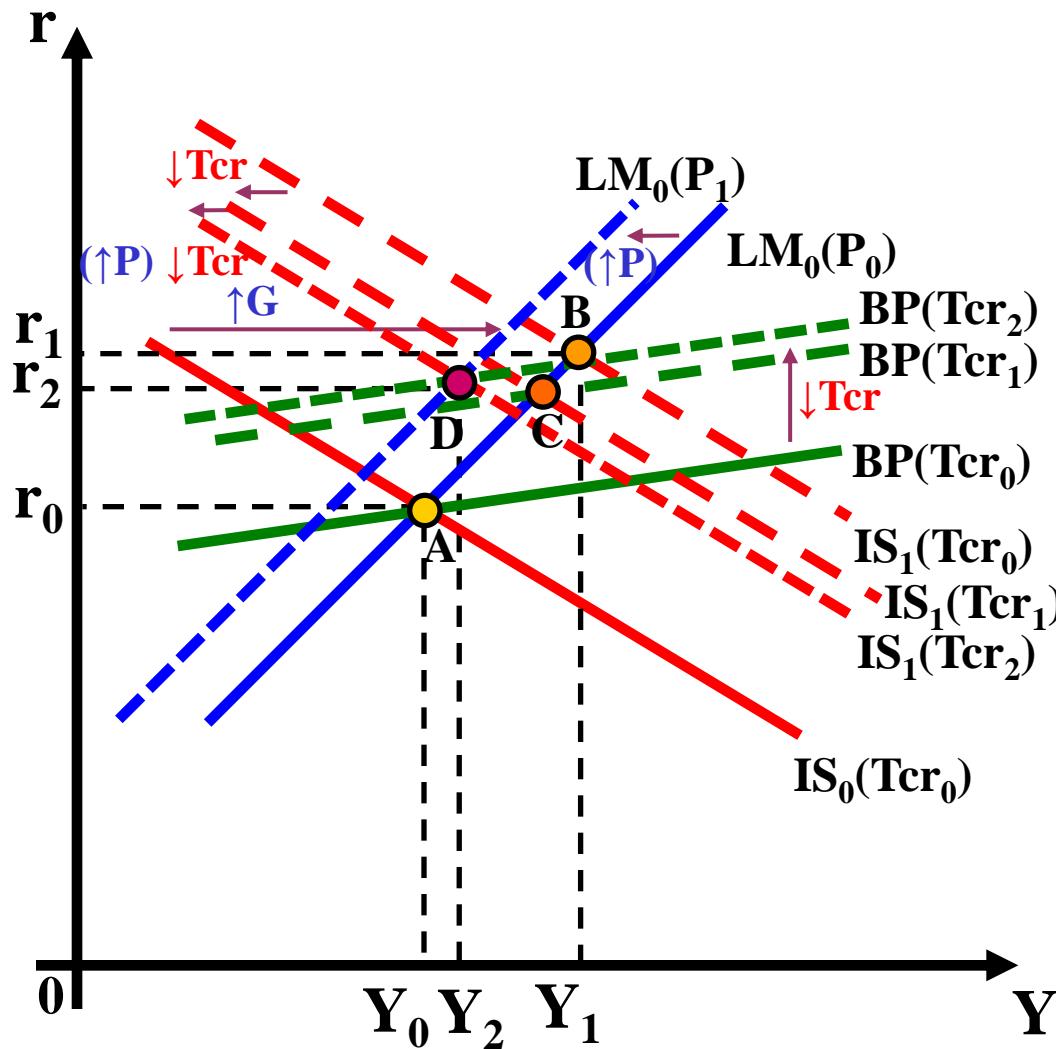
IS-LM-BP, TIPO DE CAMBIO FLEXIBLE (aislamiento ante choques externos)



IS-LM-BP, TIPO DE CAMBIO FIJO (política fiscal con precios flexibles)



IS-LM-BP, TIPO DE CAMBIO FLEXIBLE (política fiscal con precios flexibles)



IS-LM-BP, TIPO DE CAMBIO FLEXIBLE (política monetaria con precios flexibles)

