

Income distribution and Current Account Imbalances

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- ➊ **Scope and method**
- ➋ The model
- ➌ Simulations
- ➍ Conclusions

Basic features of the model

- Large-scale stock-flow consistent model based on Godley and Lavoie (2007)
- Both dimensions of income distribution, personal and functional, are explicitly modeled
- We divide the household sector into deciles and trace savings, debt and consumption through time
- Three idealized economies (U.S., Germany, China) are modelled as one complete system

Shocks and simulations

- Personal income distribution through wage differentials and dividend income
- Functional income distribution and corporate saving through aggregate wage share
- Consumption-GDP ratio, debt-income ratio, sectoral financial balances and current account balance are obtained through simulation (robustified through comparison analysis)

Balance sheet matrix

Assets and Liabilities	Currency	'United States'			'Germany'			'China'			Σ
		Households A $i=1,\dots,10$	Firms A	Banks A	Households B $i=1,\dots,10$	Firms B	Banks B	Households C $i=1,\dots,10$	Firms C	Banks C	
Deposits	A	$+m_d^{i,A}$		$-m_s^A$							0
	B				$+m_d^{i,B}$		$-m_s^B$				0
	C							$+m_d^C$		$-m_s^C$	0
Consumer loans	A	$-l_{h,d}^{i,A}$		$+l_{h,s}^{AA}$			$+l_{h,s}^{BA}$			$+l_{h,s}^{CA}$	0
	B			$+l_{h,s}^{AB}$	$-l_{h,d}^{i,B}$		$+l_{h,s}^{BB}$			$+l_{h,s}^{CB}$	0
	C			$+l_{h,s}^{AC}$			$+l_{h,s}^{BC}$	$-l_{h,d}^{i,C}$		$+l_{h,s}^{CC}$	0
Business loans	A		$-l_{f,d}^A$	$+l_{f,s}^A$							0
	B					$-l_{f,d}^B$	$+l_{f,s}^B$				0
	C								$-l_{f,d}^C$	$+l_{f,s}^C$	0
Equities	A	$+e_d^{i,A} * p_e^A$	$-e_s^A * p_e^A$								0
	B				$+e_d^{i,B} * p_e^B$	$-e_s^B * p_e^B$					0
	C							$+e_d^{i,C} * p_e^C$	$-e_s^C * p_e^C$		0
Capital stock	A		$+k^A$								k^A
	B					$+k^B$					k^B
	C								$+k^C$		k^C
Σ	A	$= v_h^{i,A}$	$= v_f^A$	$= 0$							$= k^A + nfa^A$
	B				$= v_h^{i,B}$	$= v_f^B$	$= 0$				$= k^B + nfa^B$
	C							$= v_h^{i,C}$	$= v_f^C$	$= 0$	$= k^C + nfa^C$

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Open economy and GDP

$$ex^{nj} = e^j \cdot im^j / x^{jn}, \quad ex^{kj} = (1 - e^j) \cdot im^j \cdot x^{jk}, \quad ex^j = ex^{jn} + ex^{jk} \quad (1)$$

$$im^j = \mu \cdot c^j \quad (2)$$

$$nx^j = ex^j - im^j \quad (3)$$

$$y^j = c^j + i^j + nx^j \quad (4)$$

- Variables: ex^{nj} , ex^{kj} Exports from countries n and k to country j; ex^j Exports; im^j Imports; nx^j Net exports; y^j GDP
- Parameters: e^j share determining country j's imports from other countries; μ Import elasticity

Consumption and the Relative income hypothesis

Consumption of top 10 percent households:

$$c^{1,j} = o^{1,j} \cdot v_h^{1,j} + \kappa \cdot (1 + g^j) \cdot yd_{t-1}^{1,j}; \quad j = A, \dots, C \quad (5)$$

Consumption of bottom 90 percent households under upward looking status comparisons:

$$c_{de}^{i,j} = o^{i,j} \cdot v_h^{i,j} + \kappa \cdot [1 - (\alpha_0 - \alpha_1^j)] \cdot (1 + g^j) \cdot yd_{t-1}^{i,j} + (\alpha_0 - \alpha_1^j) \cdot (1 + g^j) \cdot c_{t-1}^{i-1,j} \quad (6)$$

$i = 2, \dots, 10 \quad j = A, \dots, C$

- Calibration of α_1^j : Influenced by institutional environment, e.g. provision of public infrastructure (schools, health care, social transfers) and labor market specifications (firm-specific skills, labor market mobility)
- Variables: c_{de} Desired level of consumption; $v_h^{i,j}$ Decile-specific wealth; $yd_{t-1}^{i,j}$ Decile-specific disposable income; $c_{t-1}^{i-1,j}$ Consumption of reference group
- Parameters: o Marginal propensity to consume out of wealth; κ Propensity to consume out of income; α_0 natural rate of imitation; α_1^j household-specific penalty term; g^j Growth rate

Consumption constraints

$$c^{i,j} = z_1^{i,j} \cdot c_{de}^{i,j} + z_2^{i,j} \cdot c_c^{i,j}, \quad c^j = \sum_{i=1}^{10} c^{i,j}, \quad i = 2, \dots, 10 \quad j = A, \dots, C \quad (7)$$

$$c_c^{i,j} = o^{i,j} \cdot v^{i,j} + \kappa \cdot \left(1 - \left(\alpha_0 - \alpha_1^j\right)\right) \cdot \left(1 + g^j\right) \cdot yd_{t-1}^{i,j}, \quad (8)$$

$$z_1^{i,j} = \begin{cases} 1 & \text{if } l_{h,t-1}^{i,j}/yd_{t-1}^{i,j} \leq \pi^{i,j} \\ 0 & \text{if } l_{h,t-1}^{i,j}/yd_{t-1}^{i,j} > \pi^{i,j} \end{cases}, \quad z_2^{i,j} \text{ the other way around}$$

- Variables: $c^{i,j}$ Decile-specific actual consumption; $c_c^{i,j}$ Decile-specific constrained consumption; $c_{de}^{i,j}$ Decile-specific desired consumption; c^j Aggregate consumption; $l_{h,t-1}^{i,j}/yd_{t-1}^{i,j}$ Decile-specific debt-income ratio; $\pi^{i,j}$ Decile-specific maximum level of debt-income ratio
- Parameters: $z_1^{i,j}, z_2^{i,j}$ Indicator functions which take value of 0 or 1 depending on whether household has reached maximum level of debt-income ratio

Households' credit demand

Household's total credit demand

$$l_{h,d}^{i,j} = l_{h,d,t-1}^{i,j} + \nu^{i,j} \cdot c^{i,j}, \quad i = 1, \dots, 10 \quad j = A, \dots, C \quad (9)$$

Household's credit demand from foreign banks (or foreign money buys foreign goods)

$$l_{h,d}^{i,nj} = l_{h,d,t-1}^{i,nj} + \left(ex^{nj} * xr^{jn} \right) \cdot \psi^{i,j}, \quad \psi^{i,j} = l_{h,d}^{i,j} / l_{h,d}^{i,j}, \quad j, n = A, \dots, C \quad j \neq n \quad (10)$$

Household's credit demand from domestic banks

$$l_{h,d}^{i,jj} = l_{h,d}^{i,j} - l_{h,d}^{i,nj}, \quad j, n = A, \dots, C \quad j \neq n \quad (11)$$

- Variables: $l_{h,d}^{i,j}$ Total credit demand; $c^{i,j}$ Decile-specific consumption; $l_{h,d}^{i,nj}$ Credit demand from foreign banks; $l_{h,d}^{i,jj}$ Credit demand from domestic banks; ex^{nj} Exports from foreign country to domestic country; xr^{jn} Exchange rate; $\psi^{i,j}$ Household's share of total credit
- Parameters: $\nu^{i,j}$ Share of consumption financed by credit

Personal income distribution and financial balance

$$yd^{i,j} = wb^{i,j} + \beta_{t-1}^{i,j} \cdot f_D^j + r_{m,t-1}^j \cdot m_{h,d,t-1}^{i,j} - r_{lh,t-1}^j \cdot l_{h,t-1}^{i,j}, \quad i = 1, \dots, 10; j = A, \dots, C, \quad (12)$$

$$wb^{i,j} = \delta^{i,j} \cdot wb^j \quad (13)$$

Household financial balance: $yd^{i,j} - c^{i,j}$

- Variables: $yd^{i,j}$ Decile-specific disposable income; $wb^{i,j}$ Decile-specific wage bill; f_D^j Aggregate distributed profits; $m_{h,d,t-1}^{i,j}$ Decile-specific stock of deposits; $l_{h,t-1}^{i,j}$ Decile-specific stock of consumer loans; wb^j Aggregate wage bill
- Parameters: $\beta_{t-1}^{i,j}$ Decile-specific share of stocks; $r_{m,t-1}^j$ Interest rate deposits; $r_{lh,t-1}^j$ Interest rate on consumer loans; $\delta^{i,j}$ Decile-specific share of aggregate wage bill

Current account and household financial balance

$$ca^j = nx^j + \left[\left(r_{lh}^j \cdot l_{h,d,t-1}^{jn} \cdot x^{jn} \right) + \left(r_{lh}^j \cdot l_{h,d,t-1}^{jk} \cdot \frac{1}{x^{jk}} \right) - \left(r_{lh}^n \cdot l_{h,d,t-1}^{nj} \right) - \left(r_{lh}^k \cdot l_{h,d,t-1}^{kj} \right) \right] \quad (14)$$

$j, k, n = A, \dots, C$ with $j \neq n$ and $j \neq k$

- Variables: ca^j Current account; nx^j Net exports; $r_{lh}^j, r_{lh}^k, r_{lh}^n$ interest rate on household loans; $l_{h,d}^j$ Household loans; x^{jn}, x^{jk} Exchange rates

Effects on the current account

- Consider an increase in personal income inequality triggering expenditure cascades
- Consumption and imports rise and net exports will fall
- Interest payments for consumer loans from foreign banks will increase
- Both effects will have a negative impact on current account

Corporate finance and investment

$$i^j = g^j \cdot k_{t-1}^j; \quad g^j = \gamma_1^j + \gamma_2^j \cdot u^j \quad (15)$$

$$f_U^j = f_T^j - r_{lf,t-1}^j \cdot l_{f,d,t-1}^j - f_D^j \quad (16)$$

$$f_D^j = (1 - s_f^j) \cdot (f_{T,t-1}^j - r_{lf,t-1}^j \cdot l_{f,d,t-1}^j) \cdot (1 + g_{t-1}^j) \quad (17)$$

Corporate financial balance: $f_U^j - i^j$

- Variables: i^j Investment; g^j Rate of accumulation; k_{t-1}^j Capital stock; u^j Rate of capacity utilisation; f_U^j Undistributed profits; f_D^j Distributed profits; f_T^j Total profits; $r_{lf,t-1}^j$ Interest rate on business loans; $l_{f,d,t-1}^j$ Stock of business loans;
- Parameters: γ_1^j Autonomous component of investment; γ_2^j Sensitivity of investment to changes in capacity utilisation; s_f^j Corporate saving rate

Current account and corporate financial balance

$$ca^j = nx^j + \left[\left(r_{lh}^j \cdot l_{h,d,t-1}^{jn} \cdot x^{jn} \right) + \left(r_{lh}^j \cdot l_{h,d,t-1}^{jk} \cdot \frac{1}{x^{jk}} \right) - \left(r_{lh}^n \cdot l_{h,d,t-1}^{nj} \right) - \left(r_{lh}^k \cdot l_{h,d,t-1}^{kj} \right) \right] \quad (18)$$

$j, k, n = A, \dots, C$ with $j \neq n$ and $j \neq k$

- Variables: ca^j Current account; nx^j Net exports; $r_{lh}^j, r_{lh}^k, r_{lh}^n$ interest rate on household loans; $l_{h,d}^j$ Household loans; x^{jn}, x^{jk} Exchange rates

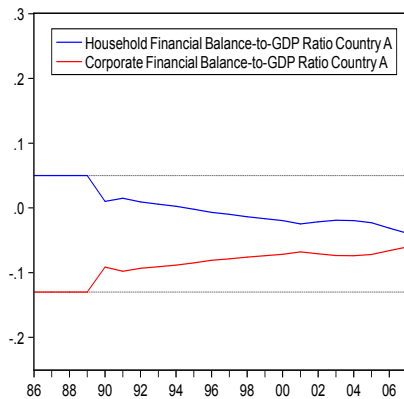
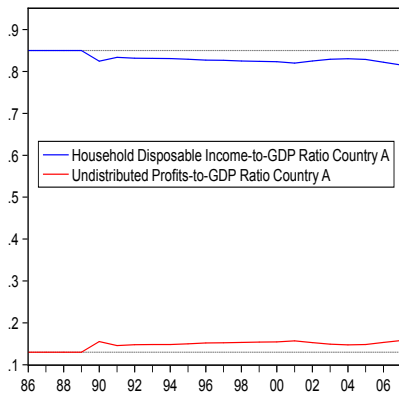
Effects on the current account

- Consider an increase of the profit share and retained corporate earnings
- Distributed profits fall and, as a result, disposable income and consumption
- Limited (or no) rise of top end inequality
- Both effects will have a positive impact on current account

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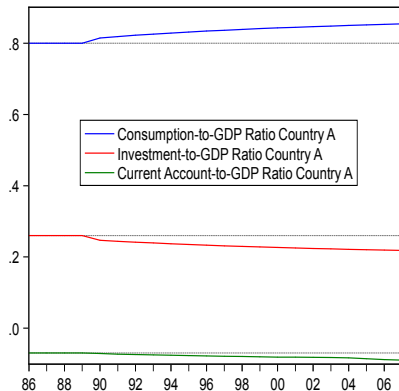
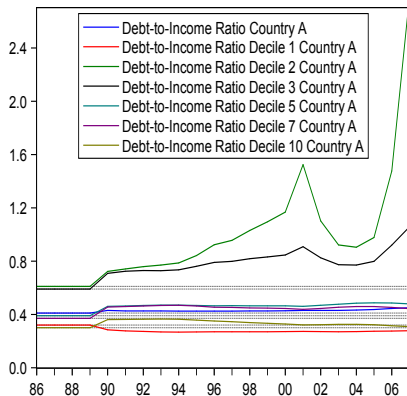
GDP income approach and sectoral financial balances

(Shock on personal income distribution dominates)



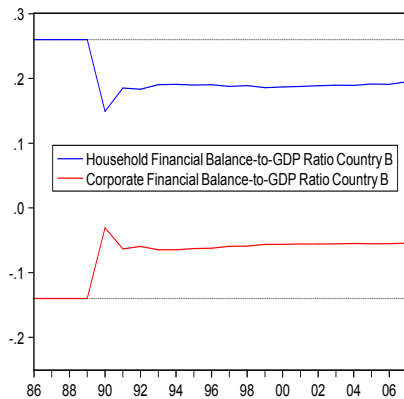
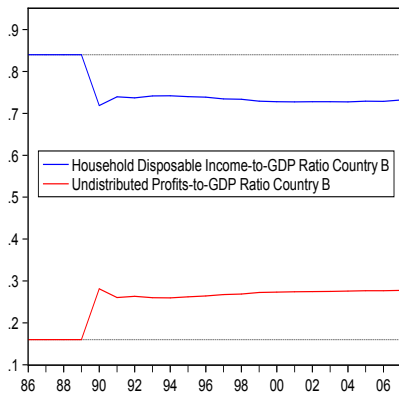
Debt-income ratios and GDP expenditure approach

(Shock on personal income distribution dominates)



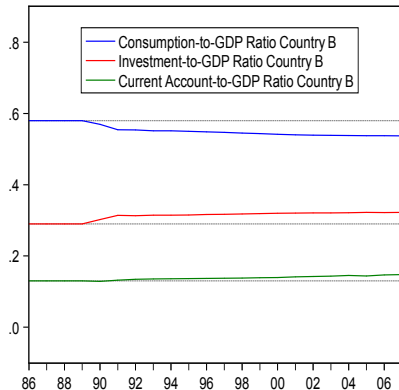
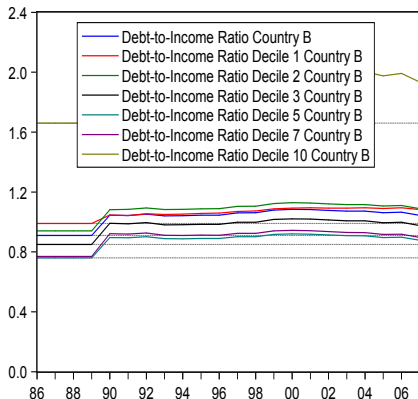
GDP income approach and sectoral financial balances

(Shock on functional income distribution dominates, corporate veil)



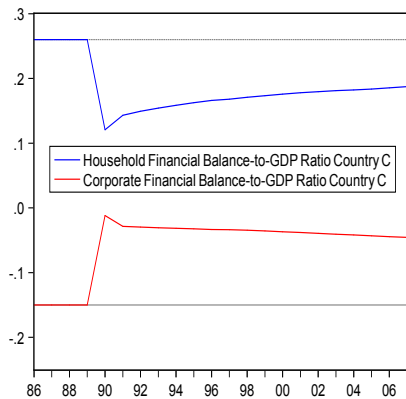
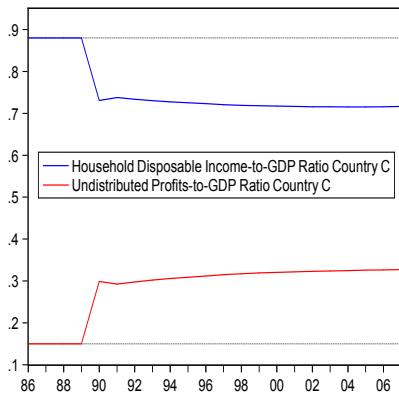
Debt-income ratios and GDP expenditure approach

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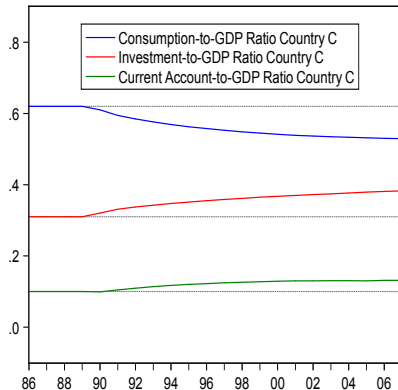
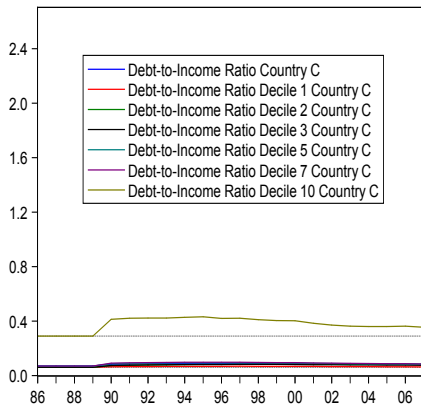
GDP income approach and sectoral financial balances

(Shock on functional income distribution dominates, financial repression)



Debt-income ratios and GDP expenditure approach

(Shock on functional income distribution dominates, financial repression)



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Concluding remarks

- Income inequality can be identified as one source of current account imbalances
- Consumption emulation and rising (top end) inequality lead to debt-financed expenditure cascades and a decline in household financial balance, given the institutional environment (e.g. deregulated financial markets) in the U.S.
- Fall of the wage share improves the corporate financial balance and leads to an improvement of the current account, given the institutional environment (labor markets, corporate and government veil or sophistication of financial markets) in Germany, China
- Understanding the institutional framework is crucial for understanding the links between income inequality and current account imbalances