

# Gender in a Nonlinear Post-Keynesian Fiscal-Policy Model

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## Introduction (1): Related literatures

- ▶ Kaleckian-feminist macro, e.g., Blecker and Seguino (2002)
- ▶ Harrodian or Steindlian arguments regarding stability of growth, e.g., Skott (2012) and Hein, Lavoie and van Treek (2012)
- ▶ Crisis and post-crisis inspired literature on fiscal and monetary policy rules, e.g., Palley (WP 2010) and Ryoo and Skott (2016)

- ▶ Heterodox literature on political economy of government deficits and debt, e.g., Foley and Michl , You and Dutt (1996) and Commendatore et al. (2009)
- ▶ Stock-flow-consistent Keynesian and Post Keynesian macro, e.g., Godley and Lavoie (2007; 2012)
- ▶ Nonlinear dynamics and complexity e.g., Goodwin (1990), Commendatore et al. (2014), Keen (1995)
- ▶ Discussion about Post Keynesian and post-Keynesian economics as bases for a feminist economics, e.g. Danby (2004) and review by Brun (2007)

## Introduction (2): Project of Which This Is a Part

- ▶ Our (Hannsgen's and Young-Taft's) fiscal policy model project: a summary
- ▶ fiscal policy model page at my blog: [greghannsgen.org](http://greghannsgen.org) (2017, under construction)
- ▶ Hannsgen (2014) *Metroeconomica*. A model that is more or less “real.” Endogenous fiscal policy, capacity utilization, markup & (optionally) per-sector labor force size
- ▶ Hannsgen and Young-Taft (2015) Adds (1) financial crises as probabilistically modeled discrete jumps in state space, (2) consumer debt, (3) margin loans, and (4) inflation and deflation.
- ▶ Conference papers. 2014-present.

## Introduction (3): "Engendering" moves in model in this paper

- ▶ differential effects of male and female wage income on household borrowing
- ▶ gender and sector (public vs. private) wage differentials
- ▶ gender and sector differences in socially necessary labor inputs
- ▶ gender differences in effect of unemployment rates on rate of change of government spending

## Introduction (4): Behavioral differences?

- ▶ Recent book by Fine (2017) challenges hypothesis of testosterone-based sex differences in behavior
- ▶ Survey by Floro and Seguino (2002) finds some evidence for gender differences in consumption propensities
- ▶ Nelson (2017) challenges claims of gender differences in risk-taking
- ▶ Survey by Seguino (2017) on efforts to endgender macro theory and policy

## Introduction (5): Non-engendered framework

- ▶  $p$ : Desired public spending and employment depend on  $p$ ,  $un_1$ , and  $un_2$
- ▶  $u$ : Kalecki-Stiendl desired capacity utilization with Kaldor (1940) nonlinearity and endogenous “normal” capacity
- ▶  $m$ : Kaleckian countercyclical markup with nonlinearity plus stable  $m$  adjustment
- ▶  $l_{ff}$ ,  $l_{fm}$ : Endogenous female and male labor forces (e.g., Cornwall, Setterfield)
- ▶  $l_o$ : Accounting identity for loans with lending based on income accelerator (Dutt 2006)
- ▶  $b$ : Demand-determined fraction of financial assets held as 1) bills; 2) state money



# Stock-flow accounting (1): Balance Sheet Matrix

Table: Fiscal Policy Model with Gender Balance-Sheet Matrix

Asset	Sector			Total
	P	K	W	
Government Debt	$-b$	$b$	0	0
High-Powered Money	$-\mathcal{M}$	$\mathcal{M}$	0	0
Capital Goods	0	1	0	1
Net Worth	$-\ell$	$\ell + 1$	0	1
Household Debt	0	$l_0$	$-l_0$	0
Net Financial Position	$-\ell$	$w$	$-l_0$	0

## Transactions Flow Matrix for Model with Gender

	P sector		K sector		W sector		Sum
	Current	Capital	Current	Capital	Current	Capital	
Consumption			$+c_W$		$-(1 - \tau_1)(w + wp) + i_L lo$ $- newhhborrowing$		0
Wages	$-wp$		$-w$		$+(wageincfem$ $+ wageincmale) \left( \frac{1}{1 - \tau_1} \right)$		0
Bill interest	$-ib$		$+ib$				0
Loan interest			$+i_L lo$		$-i_L lo$		0
Taxes	$+tr$		$-\tau_2(\pi$ $-\delta$ $+ \bar{ib})$		$-\tau_1(w + wp)$		0
Rate of change in bills		$+\dot{b}$ $+ gb$		$-\dot{b}$ $- gb$			0
Rate of change in currency		$+\dot{\mathcal{M}}$ $+ g\mathcal{M}$		$-\dot{\mathcal{M}}$ $- g\mathcal{M}$			0
Rate of change in consumer loans				$-\dot{lo}$ $- glo$		$\dot{lo}$ $+ glo$	0
Rate of change in capital				0			0
Sum	$-df$	$+\dot{\ell}$ $+ g\ell$	$+kbal$	$n\dot{w}$ $+ g$ $* nw$	$+newhhborrowing$	$-\dot{lo}$ $- glo$	0

## Equations of Model (1): Reduced System

$$\dot{p} = \alpha_p[(disc_1 un_1 + un_2 - unconstant) - \alpha_{pp}(p - p_T)], \quad (1)$$

$$\dot{u} = \alpha_u(u_d - u), \quad (2)$$

$$\dot{m} = \alpha_{mm}(m_T - m) + \alpha_{mu}(u_T - u)^5, \quad (3)$$

$$\dot{lff} = g_{lff} lff, \quad (4)$$

$$\dot{lfm} = g_{lfm} lfm, \quad (5)$$

$$\dot{g} = \alpha_g(g_d - g), \quad (6)$$

$$\dot{lo} = newhhhborrowing + i_L lo - g \cdot lo, \quad (7)$$

$$\dot{b} = \alpha_{bl} df - gb, \quad (8)$$

for  $0 < \alpha_{bl} < 1$ ,  $0 < u_T < 1$ ,  $p_T > 0$ ,  $b > 0$ ,  
 $0 < u < 1$ ,  $p > 0$ ,  $k > 0$ , and  $c_K > 0$ . The model  
requires appropriate initial conditions for all state  
variables. The initial state vector must obey the  
second set of inequalities and the static equations  
below that appear in the appropriate model.

# Dynamic properties of model (1)

- ▶ results from this model will need to be obtained via simulation due to the fact that it is highly nonlinear
- ▶ our first simulation shows the variables quickly diverging, with no clear indication of longer-run tendencies

## Dynamical properties of model (2)

- ▶ we assume unstable output adjustment AT EQUILIBRIUM but nonlinearity in investment function stabilizes globally
- ▶ countercyclical markup destabilizes
- ▶ countercyclical fiscal policy stabilizes
- ▶ Stock-flow effects and stability
  - ▶ model will systematically tend toward government deficits, and initially rising government interest bill despite constant exogenous interest rate
  - ▶ we expect consumer loans to accentuate cyclical dynamics, as borrowing rather than debt is a function of household disposable income

## Dynamical properties of model (3): How does gender change the stability properties?

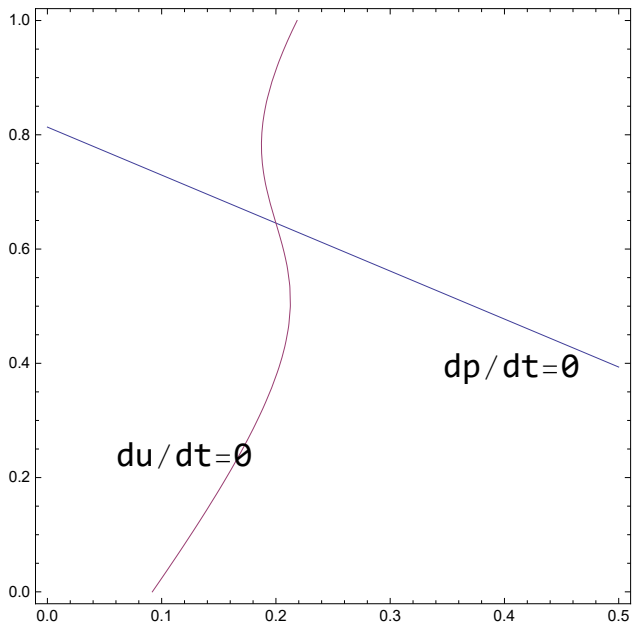
- ▶ a key research question will be how the gender structure of the model might change these dynamical properties of the model, including stability, bifurcations, limit cycles, etc.
- ▶ gender wage inequality and occupational inequality will weaken stabilizing effects of low-wage public sector
- ▶ gender wage inequality will worsen the destabilizing effects of private sector investment, because of unstable output-adjustment dynamics

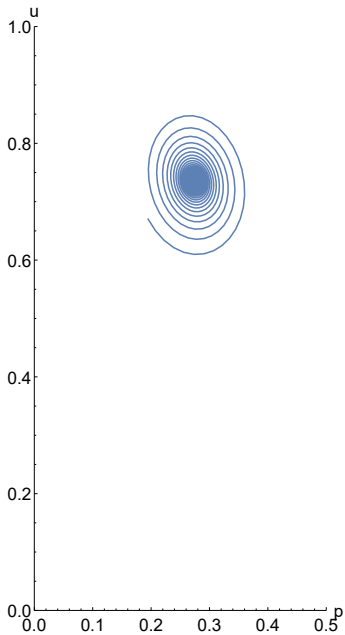
## Dynamical properties of model (4): How does gender change the stability properties?

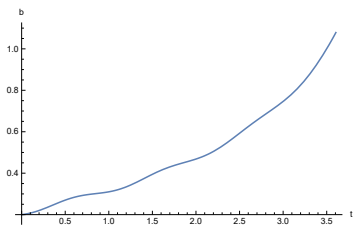
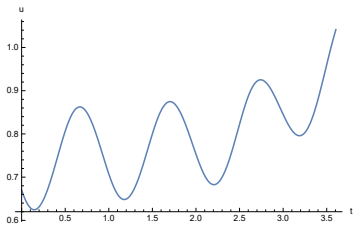
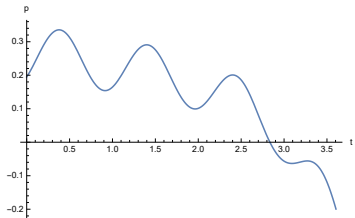
- ▶ stabilizing effects of countercyclical fiscal policy may also be changed by gender-inequality in responsiveness of spending to unemployment



Thank you!







## Table: Shackle Model Transaction-Production Table

	Sector		K	
	P			
Account	Current		Capital	
Consumption			$c_W$	
Wages	$-p$		$-(1-s)(g + \delta + c)$	$p + (1-s)(g + \delta + c)$
Bill interest	$-\bar{i}b$		$\bar{i}b$	
Taxes	$(1 - \tau)(u + p + \bar{i}b)$		$-(1 - \tau)(su + \bar{i}b)$	$-(1 - \tau)(su + \bar{i}b)$
Rate of change in bills		$\dot{b} + gb$		$-\dot{b} - gb$
Rate of change in currency		$\dot{\mathcal{M}} + g\mathcal{M}$		$-\dot{\mathcal{M}} - g\mathcal{M}$
Rate of change in capital				0
Sum	$-df$	$\dot{l} + gl$	$df$	$-\dot{w} - gw$

Note:  $P$  pertains to public,  $K$  pertains to capitalist firm,  $W$  pertains to worker, and  $KH$  pertains to capitalist household sector.