

Financial and Labor Market Frictions in a Small Open Economy Model

Lawrence J. Christiano

Northwestern University

Mathias Trabandt

Sveriges Riksbank

Karl Walentin

Sveriges Riksbank

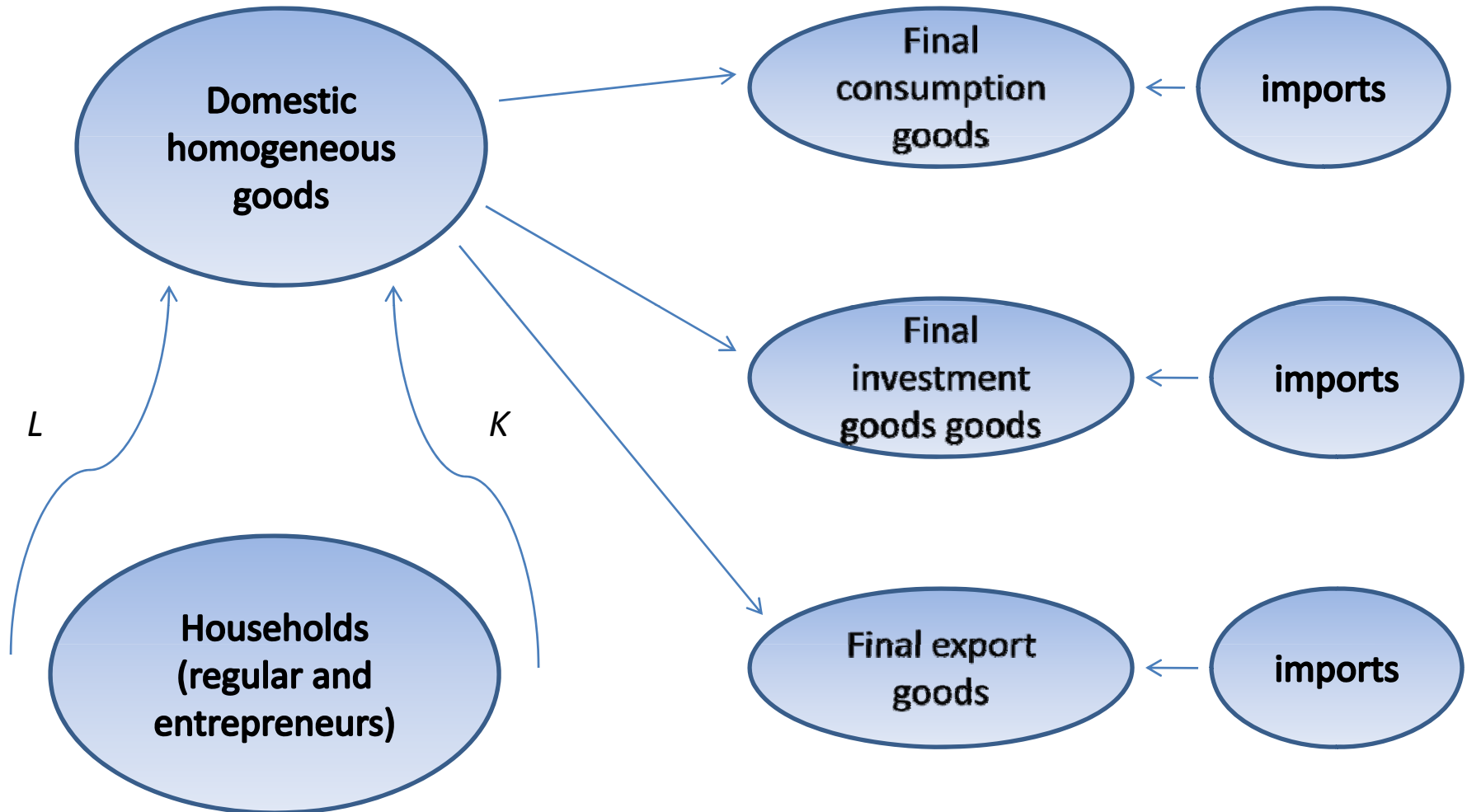
Questions:

- Are Financial Frictions Important as a Source of Shocks and/or Propagation in Aggregate Data?

Model Structure

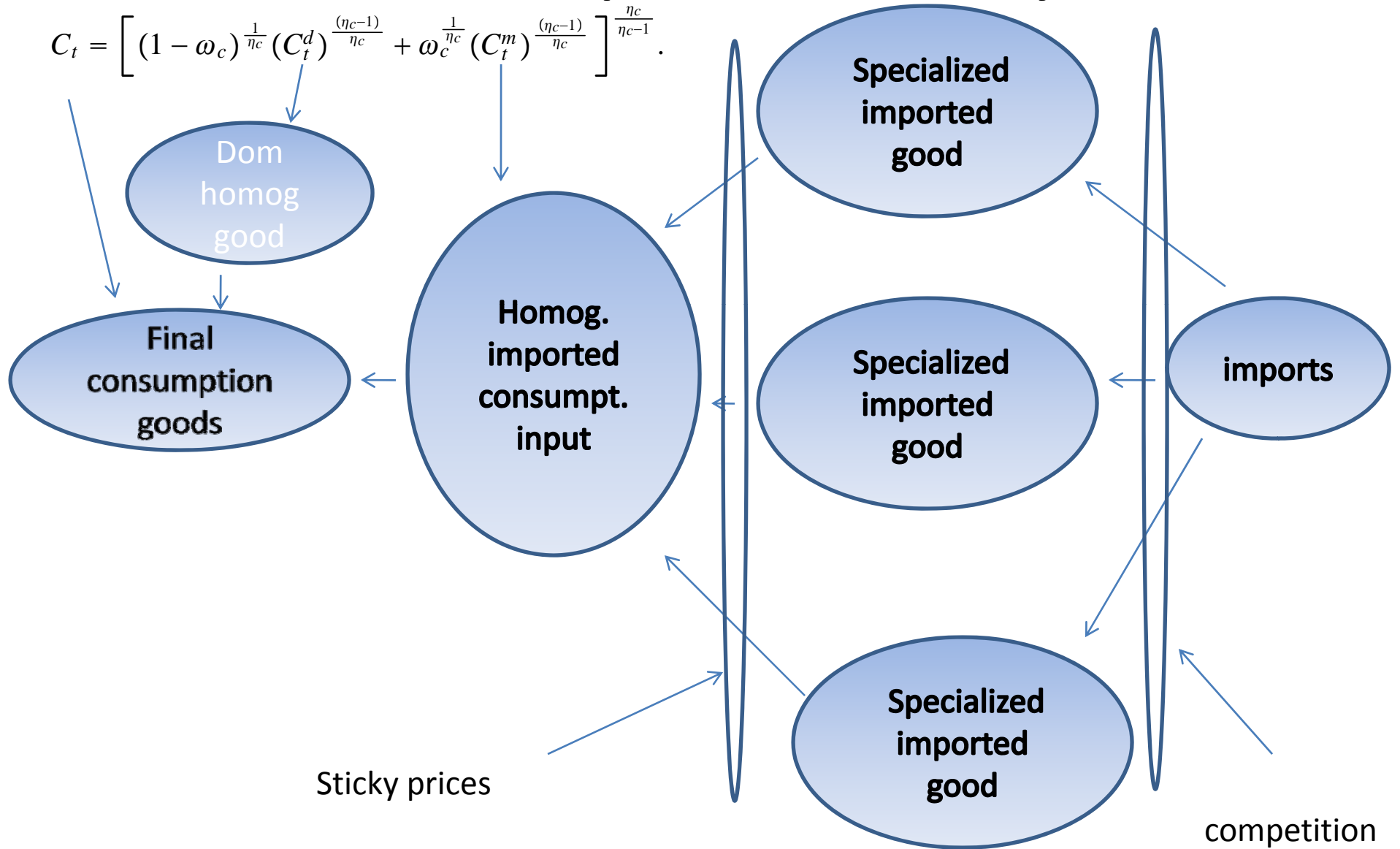
- Base: closed economy model of CEE.
- Add: Financial Frictions as in BGG, CMR.
- Add: Labor Market Frictions as in MP, Gertler-Trigari, CIMR.
- Add: Open Economy as in Adolfson, Laséen, Lindé and Villani (2005)

Small Open Economy



Small Open Economy

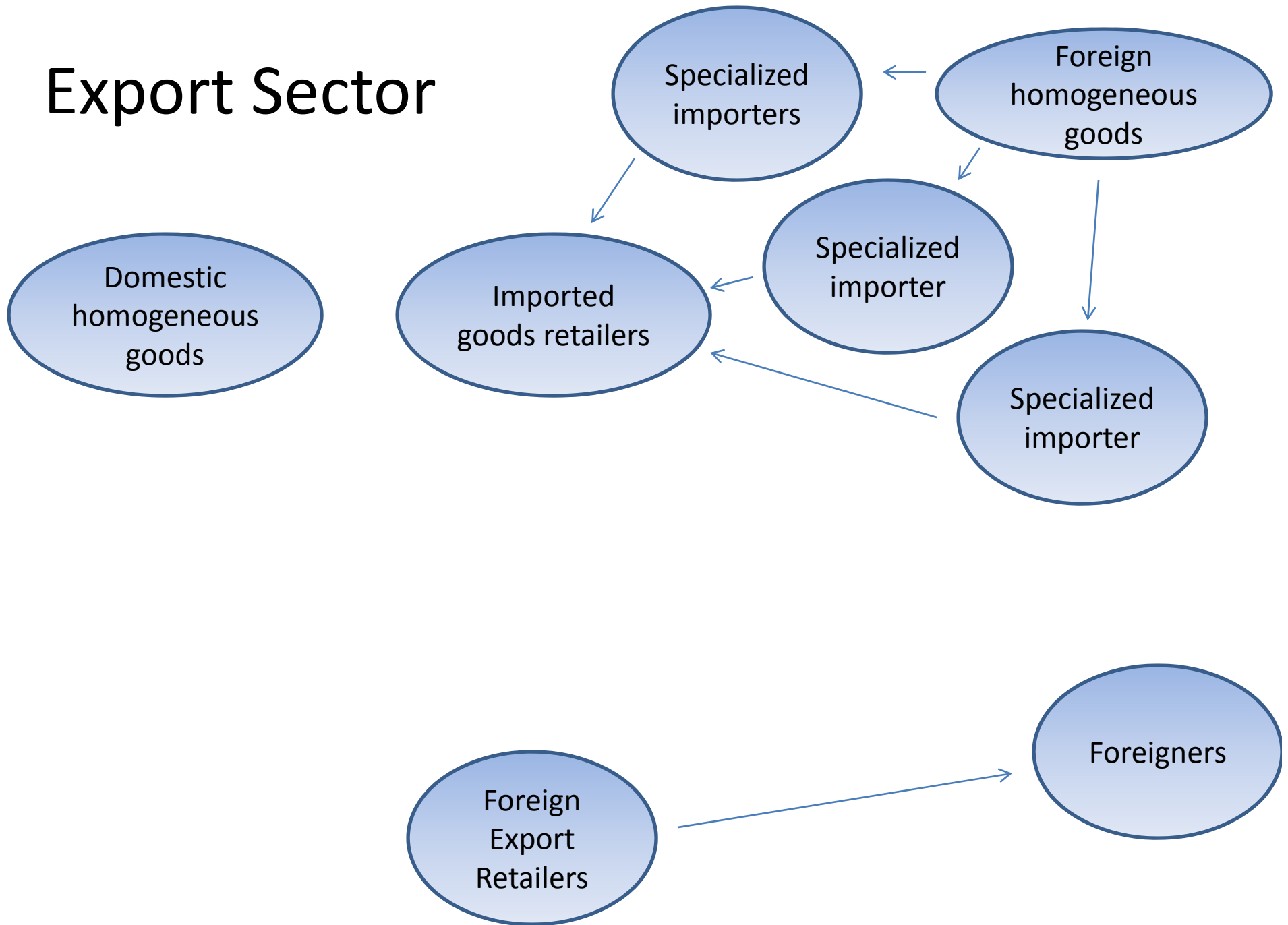
$$C_t = \left[(1 - \omega_c)^{\frac{1}{\eta_c}} (C_t^d)^{\frac{(\eta_c-1)}{\eta_c}} + \omega_c^{\frac{1}{\eta_c}} (C_t^m)^{\frac{(\eta_c-1)}{\eta_c}} \right]^{\frac{\eta_c}{\eta_c-1}} .$$



Need Additional Price Frictions in Export Sector

- Exports potentially defeat ‘hump-shape’ response of output to a monetary shock.
- Recall: habit in consumption, investment adjustment costs limit rise in demand after monetary policy shock, and so limit rise in output in closed economy.
- In open economy, extra source of demand: exports.
 - Expansionary MP shock depreciates exchange rate, S , stimulates foreign demand.
 - To stop this, we suppose that exports have sticky prices, set in foreign currency units (‘pricing to market’)

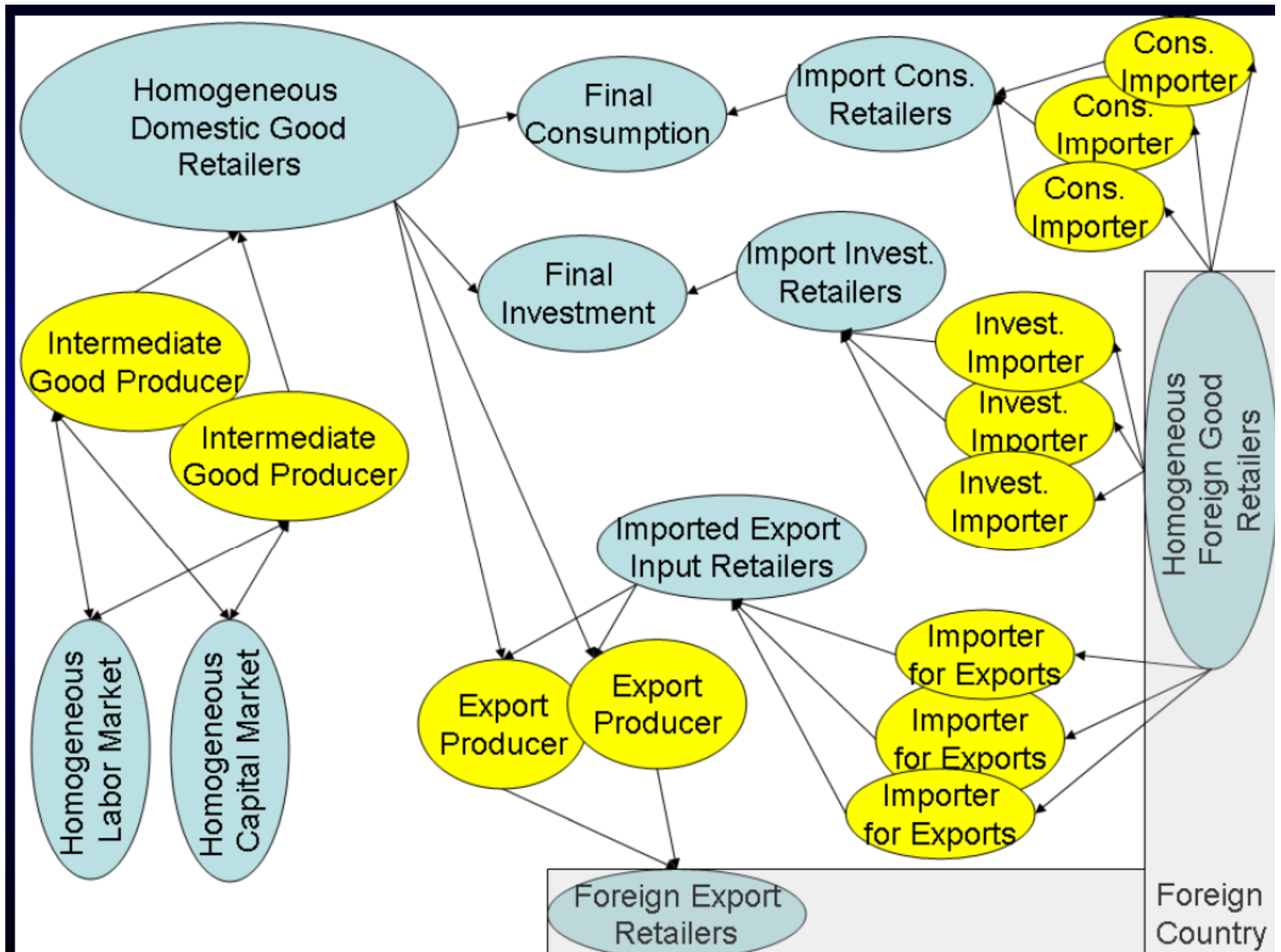
Export Sector



Export Sector



- The whole economy....all at once!



A Note on Swedish Data

- Pre-1992: exchange rate targeting.
- Post 1995: inflation targeting:
 - Ramsey-optimizing monetary policy committee loss function.
 - Taylor rule.
- Important structural break that can in principle be modeled. We only work with post-95 data and characterize policy as Taylor rule.

19 Shocks in the Model

- μ_z, μ_Ψ unit-root neutral and invest. specific technology
- ϵ, Υ stationary neutral and invest. specific technology
- ζ^c consumption preference shock
- σ, γ financial frictions shocks
- $\tilde{\phi}$ risk premium shock
- ε_R monetary policy shock
- g government consumption shock
- λ_i markup shocks ($i = d, x, mc, mx, mi$)
- η bargaining power of workers
- $\varepsilon_{y^f}, \varepsilon_{\pi^f}, \varepsilon_{R^f}$ foreign shocks

Data and Estimation

- Estimation on quarterly Swedish data from 1995Q1-2008Q1 (stay away from 1992 break)
- Real quantities in per capita terms. Data in demeaned quarterly first differences, except inflation and interest rates.
- 19 data series

$R_t, \pi_t, \pi_t^c, \pi_t^i, \pi_t^*, R_t^*, Spread_t$

$\Delta \ln(W_t/P_t), \Delta \ln C_t, \Delta \ln I_t, \Delta \ln q_t, \Delta \ln H_t, \Delta \ln Y_t, \Delta \ln X_t$

$\Delta \ln M_t, \Delta \ln Y_t^*, \Delta \ln G_t, \Delta \ln N_t, \Delta \ln Unemprate_t$.

Parameter	Value	Description
α	0.4	Capital share in production
β	0.999	Discount factor
→ ω_i	0.43	Import share in investment goods
ω_c	0.25	Import share in consumption goods
→ ω_x	0.35	Import share in export goods
η_g	0.3	Government consumption share of GDP
τ_k	0.25	Capital tax rate
τ_w	0.35	Payroll tax rate
τ_c	0.25	Consumption tax rate
τ_y	0.30	Labor income tax rate
τ_b	0.0	Bond tax rate
μ_z	1.0058	Steady state growth rate of neutral technology
μ_ψ	1.0003	Steady state growth rate of investment technology
$\bar{\pi}$	1.005	Steady state gross inflation target
λ_x	1.05	Export price markup
λ_j	1.2	Price markups, $j = d, mc, mi, mx$
v_t^*, v_t^x, v_t^f	1	Working capital shares
\mathfrak{G}_w	0	Wage indexation to real growth trend

→	$F(\bar{\omega})$	0.0063	Steady state bankruptcy rate
→	μ	0.55	Fraction of value of assets destroyed in bankruptcy
	W_e/y	0.001	Transfers to entrepreneurs
	L	1-0.075	Steady state fraction of employment
	N	4	Number of agency cohorts/length of wage contracts
	ρ	0.973	Survival rate of a match
	σ	0.5	Unemployment share in matching technology
	σ_m	0.5475	Level parameter in matching function

Parameter	Parameter description	Moment	Moment value	Value at post. mean
δ	Depreciation rate of capital	$p_i i/y$	0.169	0.0164
φ	Real exchange rate	$p_x x/y$	0.437	0.632
γ	Entrepreneurial survival rate	$n/(p_k'k)$	0.5	0.962
A_L	Scaling of disutility of work	ζ	0.3	67.9

	Prior distr.	Prior mean	Prior s.d.	Post. mean	Post. s.d.
ξ_d	beta	0.75	0.075	0.784	0.0370
ξ_x	beta	0.75	0.075	0.745	0.0394
ξ_{mc}	beta	0.75	0.075	0.818	0.0385
ξ_{mi}	beta	0.75	0.075	0.739	0.0417
ξ_{mx}	beta	0.75	0.075	0.741	0.0620
$indx$	beta	0.50	0.20	0.381	0.0991
σ_L	gamm	3.00	1.50	3.159	1.0463
b	beta	0.65	0.10	0.709	0.0550
S''	norm	0.80	0.20	0.863	0.1708
σ_a	gamm	0.20	0.075	0.116	0.0439
ρ_R	beta	0.85	0.10	0.849	0.0206
r_π	norm	1.70	0.10	1.714	0.0926
$r_{\Delta\pi}$	norm	0.30	0.10	0.120	0.0313
r_y	norm	0.125	0.05	0.061	0.0342
$r_{\Delta y}$	gamm	0.05	0.025	0.064	0.0189
η_i	gamm	1.50	0.25	1.524	0.2485
η_f	gamm	1.50	0.25	1.560	0.2314
η_c	gamm	1.50	0.25	1.260	0.1905
η_x	gamm	1.50	0.25	1.466	0.2377
$\tilde{\phi}_s$	beta	0.50	0.15	0.356	0.1164
$rec.share$	gamm	0.25	0.15	0.311	0.0801
$bshare$	beta	0.80	0.075	0.655	0.0763

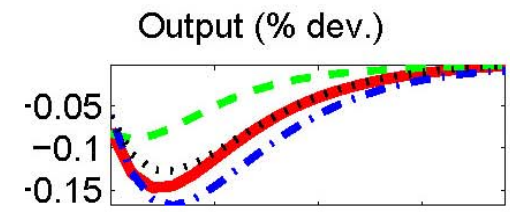
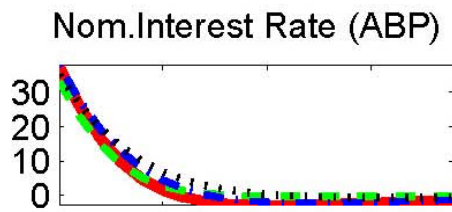
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ξ_{mx}	beta	0.75	0.075	0.741	0.0620

Priors pretty tight, data contain some information about all but one price stickiness parameter.

Tightness of prior could hide evidence that the model is wrong.

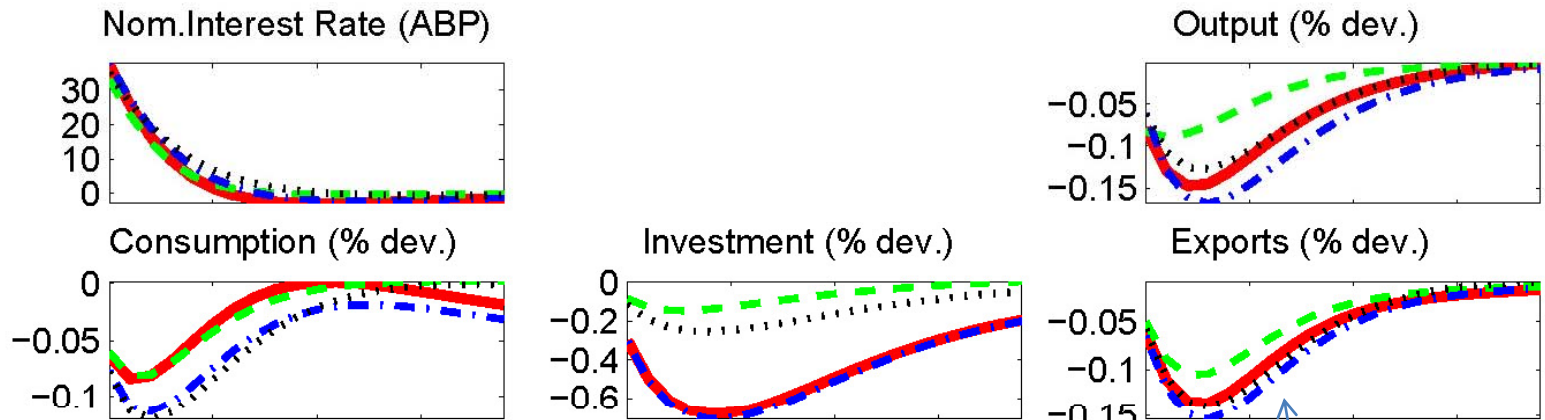
However, we will leave it up to goodness-of-fit measures (i.e., RMSEs) to tell us if the model is so much worse than alternatives that it should be abandoned.

Monetary Policy Shock

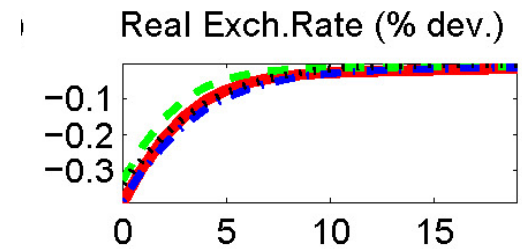


- Full Model
- - - Unemployment Model
- . - . Financial Frictions Model
- Baseline Model

Monetary Policy Shock



Exchange appreciates, exports drop



- Full Model
- - Unemployment Model
- · - Financial Frictions Model
- Baseline Model

Shocks/Variabes	Pid	Pic	Pii	R	dy	dw	dc	di	dq	dH	dG	dexp	dimp	dn	spread	dunemp
Unit-root invest. tech.	<p>Financial friction shocks important for:</p> <ul style="list-style-type: none"> output growth Investment Spread, risky versus risk free debt Net worth growth 															
Unit-root neutr. tech.																
Stat. neutr. tech.																
Stat. invest. tech.																
Consumption pref.																
Risk premium																
Monetary policy																
Gov. consumption																
Domestic markup																
Export markup																
Cons. import mkup	0.8	0.4	0.2	3.2	13.9	3.2	0.6	10.1	0.1	12.4	0.0	0.1	4.4	19.6	52.5	2.6
Invest. import mkup	1.2	1.2	1.5	6.6	7.9	1.4	2.8	65.8	2.2	4.7	0.0	0.3	6.8	27.9	20.9	0.4
Export import mkup																
Entrepreneur risk																
Entrepreneur survival																
Bargaining power																
Foreign output																
Foreign inflation																
Foreign nom.int. rate																

Conclusion

- Described small open economy model
 - Financial frictions important for shocks and propagation.