Discussion of Garcia-Cicco and Kirchner

Macroeconomic and Financial Interactions in Chile: An Estimated DSGE Approach

by
Stephanie Schmitt-Grohé
Columbia University

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This paper

• introduces 2 financial frictions (BGG and GK) into a SOE-version of a DSGE model (e.g., Adolfson et al., 2007)

• estimates the resulting framework on Chilean 2001Q1-2012Q4 data using Bayesian methods.

• then uses the estimated model to judge how important financial frictions are for accounting for observed business-cycle fluctuations in Chile.

• Paper also studies optimal monetary policy rules in the estimated model.

Main Findings regarding the importance of financial frictions:

- Introducing BGG frictions does not worsen the fit of the model, and may improve it slightly.

- Introducing GK frictions tends to make the model less consistent with the data.

Small Open Economy Version of Medium-Scale New Keynesian model + 2 financial frictions:

- Two Financial Frictions: BGG and GK
- Features special to Chile: Commodity exporter.
- Standard features of DSGE models:
  1. Calvo-price stickiness w/ partial indexation
  2. Calvo-wage stickiness w/ partial indexation
  3. Habit formation
  4. Investment adjustment costs and variable capacity utilization
  5. Local currency pricing
  6. Working capital constraint
  7. Only traded goods

14 Structural Shocks, all univariate AR(1)

1. Preference shocks, v_t
2. Neutral technology shocks, temporary, z_t
3. Neutral technology shocks, permanent, A_t
4. Investment-specific technology shocks, ϖ_t
5. Goverment spending shocks, G_t.
6. Monetary policy shocks, ϵ_t^R
7. Foreign demand shocks, Y_t^*.
8. Foreign inflation shocks, π_t^*
9. Foreign nominal interest rate shocks, R_t^*
10. Country premium shock, ζ_t
11. World commodity price shocks, p_t^{Co*}
12. Commodity endowment shocks, Y_t^{Co}
13. Financial shock 1: BGG, variance of entrepreneur-specific productivity shock, $\sigma_{\omega,t-1}$
14. Financial shock 2: GK, size of moral hazard problem, μ_t

Sample: Quarterly data from Chile: 2001Q1-2012Q4 (48 obs.)

17 Observables (all assumed to be measured with error):

14 Macro observables
$\Delta \ln GDP_t$, $\Delta \ln C_t$, $\Delta \ln I_t$, π_t, R_t, rer_t, $\Delta \ln(W_t/P_t)$, EMBI rate$_t$, G_t, Y_t^{Co}, R_t^*, Y_t^*, π_t^*, p_t^{Co*},

3 financial observables:
spr_t, (90 day loan to policy rate spread, BGG)
$\Delta \ln loan_t$
rp_t (A to AAA corporate bond spread — GK model)

Comments on the model

1.) Definition of real GDP in the model and its empirical counterpart.

In the model the value of GDP in terms of the final consumption good is given by:

$$C_t + p_t^I I_t + p_t^G G_t + p_t^H X_t^{H^*} + p_t^{Co} Y_t^{Co} - p_t^M M_t$$

The paper defines real GDP at constant prices as:

$$C_t + I_t + G_t + X_t^{H*} + Y_t^{Co} - M_t$$

Where did the relative prices go? Are all relative prices unity in the nonstochastic steady state?

Suggested solution: The empirical counterpart to GDP in terms of consumption goods is:

$$\frac{\text{nominal GDP}_t}{\text{CPI}_t}$$

2.) Preference Specification Wealth elasticity of labor supply is pinned down by functional form assumption

$$U(C_t, h_t) = \ln(C_t) - \kappa \frac{h_t^{1+\phi}}{1+\phi}$$

$$\epsilon_{hw} = \epsilon_{h\lambda} = \frac{1}{\phi} = 1$$

Miyamoto and Nguyen (2014) show, in the context of a similar model, that explaining the observed expansionary effects of increases in foreign demand on the SOE requires a near zero wealth elasticity of labor supply. Suggestion: Adopt a more flexible preference specification that detaches the Frisch elasticity of labor supply from the wealth elasticity, such as GHH preferences.

3.) Could the inclusion of nontradables assign a more important role to financial frictions?

Negative external shocks are observed to lead to large contractions in domestic absorption of tradables and nontradables.

Models with Calvo-type nominal frictions have a hard time accounting for the observed size of these contractions. Financial frictions might help bring data and model closer together by hindering the flow of capital out of the nontraded sector (that must contract) and into the traded sector (which should expand).

(4.) Commodity endowment

• Commodity modeled like an annual endowment. This is a good description for soy bean or grain exporters. But in the case of copper it might be of interest to model the rate of copper extraction over time.

• In the model the variable that enters is the value of the commodity export: $P_t^{Co} Y_t^{Co}$. Why does the paper consider 2 separate exogenous variables:

$$p_t^{Co} \quad \text{and } Y_t^{Co}$$

How to judge fit?

What the paper does so far:

- reports marginal data densities
- second moments

Results: Marginal data density is the highest for the model without financial frictions

Table 2: Log Marginal Data Density for Different Sets of Variables

	Data Set	
Model	Macro	Macro + Loans + Spread
Base	-957.5	
GK	-1006.3	-1144.0
BGG	-993.0	-1134.2
GK+BGG	-1020.9	-1201.8

These were computed using a Laplace approximation at the posterior mode.

Second Moments. Table 3.

Relative variance of consumption growth to output growth, data 1.10 over 1.02; base model 0.95 to 0.99. Seems pretty close to me. I would not highlight this as the first dimension along which the model fits poorly. (Volatilty of tby and rer seems more off, and so does the serial correlation of investment growth.)

Suggestions: Add confidence intervals for the estimated data moments.

Given that your sample is so short, report moments computed from simulated time series that are as short as the observed time series.

How to judge fit suggestions for additional tests:

(1) Matching impulse responses to identified shocks. In the open economy two shocks suggest themselves, world interest rate shocks and commodity price shocks (copper). Or identified monetary policy shocks (Müller and Meier, 2006). Then ask which model does better in explaining observed IR, the model with financial frictions or that without.

(2) Which model has better out-of-sample forecasting properties, the model with financial frictions or that without.

Adding a financial accelerator in the BGG tradition has two aspects to it.

(1) It can change the transmission mechanism of existing shocks. For example, the recession caused by a technology shock might get amplified.

and

(2) The presence of the financial friction itself opens the door for risk shocks to affect the economy. The related literature, esp. Christiano et al. (2011, 2014), has stressed the second point. These authors show that risk shocks are a major source of short-run fluctuations in U.S. and Swedish data.

Variance Decompositions

Table 5: Variance Decomposition

	Shock									
Variable	v	ϖ	z	a	R^*	π^*	p^{Co*}	R	μ	σ_ω
					A. Base					
ΔGDP	7	28	19	5	4	6	6	7		
ΔC	60	2	2	3	5	7	19	1		
ΔI	1	58	5	1	11	7	13	3		
TB/GDP	1	11	0	0	19	24	42	1		
ΔW	0	3	46	26	6	6	12	1		
R	3	17	19	1	13	10	22	14		
π	2	10	58	1	8	6	9	4		
rer	0	5	1	0	13	21	56	3		
					B. GK					
ΔGDP	38	8	4	7	5	5	9	3	1	
ΔC	53	14	2	4	4	5	18	0	0	
ΔI	14	27	18	2	12	5	18	2	1	
TB/GDP	19	9	5	1	14	17	33	1	0	
ΔW	1	8	0	32	12	18	26	1	0	
R	39	29	5	1	6	5	12	1	1	
π	32	25	5	1	9	10	15	2	0	
rer	10	15	4	1	6	13	49	1	0	
ΔL	6	33	26	11	4	2	9	3	4	
spr	15	6	16	1	1	2	2	11	45	
					C. BGG					
ΔGDP	23	9	15	9	1	3	5	6		1
ΔC	49	1	2	3	10	8	25	1		0
ΔI	0	76	1	2	5	3	8	3		2
TB/GDP	3	1	0	0	14	19	60	0		0
ΔW	0	0	41	32	7	5	12	1		0
R	11	1	17	0	23	11	24	10		0
π	7	1	51	1	15	7	12	3		0
rer	1	0	1	0	15	19	59	2		0
ΔL	1	69	17	1	3	2	3	2		1
spr	2	42	0	1	1	0	1	10		42
					D. GK+BGG					
ΔGDP	27	21	2	16	1	4	3	2	0	2

(1) The BGG financial shock explains only 1 percent of the variance of output growth. This finding is in sharp contrast to that of related papers estimating the BGG model on data from developed small open economies.

(2) External shocks explain less than 20 percent of the variance of output growth. This seems to go against conventional wisdom and SVAR evidence, which suggest that foreign shocks are an important source of fluctuations for small open economies.

Conclusion:

This could become a very influential paper because it shows that BGG and GK frictions don't help much in explaining business cyles in Chile.

It thus calls into question the usefulness of macro prudential policies that are designed specifically to address those financial frictions.