***Modelling small open developing economies in a financialized world – Adaptation for Colombian economy.***

**Production and Prices.**

1. *Variation of expected sales*

1. *Aggregate demand*

1. *Inventories and real investment in inventories*
2. *Desired inventories*
3. *Desired investment in inventories*
4. *Production*
5. *Domestic production*
6. *Capital output ratio*
7. *Imports in real terms*
8. *Variation of import propensity*
9. *Target import propensities*
10. *Real exchange rate*
11. *Exports equation*

1. *Autonomous exports growth rate.*
2. *Variation of exports propensity*
3. *Targeted exports propensity*
4. *Desired price level*
5. *Mark-up*
6. *Variation of historical unit cost*
7. *Unit cost*
8. *Change in domestic price level*

**Firms.**

1. *Gross Capital Formation.*
2. *Realized real investment.*
3. *Desired real investment.*
4. *Gross expected profits for firms*

1. *Net expected profits*
2. *Expected return per unit of capital*
3. *Total financing needs of the firms*
4. *Desired demand for FX loans*

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1. *Effective variation of firms’ loans in foreign exchange*
2. *Variation of firms’ loans in domestic currency*
3. *FX loans arbitrage parameter.*
4. *Arbitrage criteria.*
5. *Variation of firms’ deposits in foreign exchange*
6. *Gross profits of firms*
7. *Net profits of firms*
8. *Return rate on capital*
9. *Firms dividends*

1. *Firms Dividends distributed to the rest of the world.*
2. *Firms Dividends distributed to the households.*

**Households and Labour Market.**

1. *Labour*
2. *Variation of output to labour ratio*
3. *Change in nominal wages.*
4. *Households net labour income*
5. *Households financial income.*
6. *Desired target consumption*
7. *Marginal propensities to consume out of labour income*
8. *Marginal propensities to consume out of financial income*
9. *Marginal propensities to consume out of wealth*
10. *Desired consumption variation.*
11. *Effective consumption.*
12. *~~Households’ loans demand.~~*
13. *~~Sensitivity parameter.~~*
14. *~~Burden of the Households (where rep is the average repayment ratio)~~*
15. *Households savings.*
16. *New government bonds purchased by the households.*
17. *New households’ deposits in domestic currency.*
18. *Portfolio allocation of households’ savings.*

**Government.**

1. *Fiscal revenue (where are royalties)*

1. *Tax revenue*
2. *Value added tax.*
3. *Import taxes.*
4. *Royalties.*
5. *New government deposits.*

1. *Total government spending.*
2. *Government demand.*
3. *Operating expenses.*
4. *Target public investment (we are studying how to incorporate the supply side effects).*
5. *Public investment adjustment equation.*
6. *Transfers from the government to the households.*
7. *Public deficit.*
8. *Bonds interest rate*

**Banks.**

1. *New government bonds purchased by the banks.*

1. *Desired Banks demand for cross border lending.*
2. *Effective Banks demand for cross border lending.*
3. *Cross border lending rationing parameter.*
4. *Cross border lending rate.*

1. *Target Cross border lending risk premium*
2. *Adjustment of target cross border lending risk premium*

1. *Interest rate on FX loans charged to the firms.*

1. *Change in the premium on FX loans charged by the domestic banks.*

1. *Target premium*

1. *Interest rate on households’ loans (where is a mark – up over interest rate charged to the firms)*
2. *Required regulatory change in Banks foreign reserves*
3. *Change in central bank FX reserves*
4. *Domestic banks reserves*
5. *Total financial needs of the banks.*
6. *Liquidity advances granted by the CB*
7. *Own funds needed to accomplish the leverage regulation*
8. *Retained earnings by the banks*
9. *Change in the funds owned by the banks*
10. *Gross profits of banks*
11. *Interest rate on household deposits*
12. *Target interest rate on firms loans in domestic currency.*
13. *Average Funding Cost of the banks.*
14. *Change in interest rate on firms loans in domestic currency.*
15. *Net profits of banks*
16. *Banks dividends*
17. *Bank dividends distributed to the rest of the world.*
18. *Bank dividends distributed to the households.*

**Central Bank.**

1. *Monetary policy interest rate (simple Taylor rule)*
2. *Change in FX reserves owned by the CB.*
3. *Central Bank profits*

**World Trends and Capital Inflows.**

1. *Global Portfolio Flows*
2. *Portfolio flows entering to the domestic economy.*
3. *Share of total government bonds supply purchased by the rest of the world.*

1. *Expected domestic yield.*
2. *Expected foreign yield.*
3. *Country risk.*
4. *Net International Investment Position (NIIP)*
5. *Total FDI distribution (where is greenfield FDI and is non – greenfield FDI)*
6. *Total FDI growth.*
7. *Greenfield FDI.*
8. *Non – greenfield FDI.*
9. *Private equity accumulation by the rest of the world.*
10. *Firm’s equities accumulation by the rest of the world.*
11. *Bank’s equities accumulation by the rest of the world.*
12. *Private equity accumulation by the households.*
13. *Change in NFC equities*
14. *Change in NFC equities*
15. *Firms’ equities accumulation by the households.*
16. *Banks’ equities accumulation by the households.*

**Exchange Rate Dynamics.**

1. *Change in nominal exchange rate*
2. *FX demand.*
3. *FX supply.*
4. *Rate of change in real exchange rate.*
5. *Uncovered interest rate parity condition*
6. *Expected variation of the nominal exchange rate*

**Balance of Payments.**

1. *Income account.*
2. *Remittances recived from abroad*
3. *Balance of payments identity.*
4. *New government bonds purchased by the rest of the word*

**Consistency.**

We start with the identity of the Central Bank balance sheet in its flow form:

We replace the definition of required change in bank reserves:

We incorporate the Total Financial Needs of the banks:

Simplifying we get to:

We add the loans in foreign currency to both sides of the equation (multiplied by the nominal exchange rate):

We subtract the variation of the firms FX deposits (multiplied by the nominal exchange rate):

We add to both sides the foreign direct investment that received by the firms, knowing that :

Now we replace the firms savings knowing that :

The banks savings are equal to the retained earnings , therefore:

Knowing that , we get to:

We incorparate

Replacing the Balance of Payments Identity:

We simplify knowing that

Taking the current account definition, we get to:

Finally, taking into account the relationship between the government savings and the debt accumulation given by , we get to:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Industry | | Households | Banks | | Central Bank | | Government | RoW | ∑ |
| Current | Capital |  | Current | Capital | Current | Capital |
| Consumption  Realized Investment  Government Spending  Imports  Exports  Value Added Tax  ***[GDP]*** |  |  |  |  |  |  |  |  |  | 0  0  0  0  0 |
| Wages  Taxes on Imports  Royalties  ***[Gross Operating Surplus]*** |  |  |  |  |  |  |  |  |  | 0  0  0 |
| Interest on Deposits  Interest on Firms Loans  Interest on Households Loans  Interest on Firms FX Loans  Interest on Banks FX Loans  Interest on Bonds  Interest on Advances  Firms Dividends  Banks Dividends  ***[Gross National Income]*** |  |  |  |  |  |  |  |  |  | 0  0  0  0  0  0  0  0  0 |
| Remittances  Central Bank Profits  Taxes on Income and Profits  Welfare Spending  Savings |  |  |  |  |  | 0 | 0 |  |  | 0  0  0  0  0 |
| [Capital]  [Inventories] |  |  |  |  |  |  |  |  |  |  |
| Deposits  Reserves  Firms Loans  Households Loans  Bonds  Advances  FX deposits  FX Reserves  Firms FX Loans  Banks FX Loans  Firms Equities  Banks Equities |  |  |  |  |  |  |  |  |  | 0  0  0  0  0  0  0  0  0  0  0  0 |
| ∑ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |