Currency Wars, Trade Wars and Global Demand

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Introduction

- Policy debate about currency wars since the global financial crisis
- A currency war can be waged with a variety of policy instruments: interest rates, foreign exchange interventions, capital controls, inflation target, forward guidance etc.
- Now tariffs, and the risk of a trade war, are added to the mix
  - alleged equivalence between currency manipulation and tariffs
- What are the multilateral implications of these instruments in a Keynesian environment with unemployment?

Introduction

- I use a simple (two-period) model with many countries and Armington assumption
- Downward nominal wage stickiness is modeled as in Schmitt-Grohé and Uribe (2016)
- Low global demand can lead to a global liquidity trap with unemployment
- Countries can increase their employment by depreciating their currency (using various instruments) or by imposing a tariff on imports
- Literature on international contagion in global liquidity traps: Eggertsson et al (2016), Caballero, Farhi and Gourinchas (2015), Fujiwara et al. (2013), Devereux and Yetman (2014), Acharya and Bengui (2016) etc.
- Literature on macro impact of trade policy: Barbiero et al (2017), Erceg, Prestipino and Raffo (2017) and Lindé and Pescatori (2017) etc.

Introduction

Structure

1. Model
2. Results

Work in progress!

Model

- Two periods $t = 1, 2$
- World composed of a continuum of small open economies $j \in [0, 1]$
- Each economy is populated by representative household with utility

$$U = u(C) + \beta C'$$

where $u(C) = C^{1-1/\sigma} / (1 - 1/\sigma)$

- First-period consumption is the Cobb-Douglas index

$$C = \left(\frac{C_H}{\alpha_H}\right)^{\alpha_H} \left(\frac{C_F}{\alpha_F}\right)^{\alpha_F}$$

where

$$C_F = \left[\int_0^1 C_k^{(\gamma-1)/\gamma} dk\right]^{\gamma/(\gamma-1)} \qquad \gamma > 1$$

- Second-period consumption $C' = C'_H + C'_F$ (for pen and paper analysis)

Model

- Production of home good

$$Y = L$$

- Home-currency price of the home good is equal to the nominal wage, W
- The representative consumer is endowed with a fixed quantity of labor $\overline{L}$

$$L \leq \overline{L}$$

unemployment $\overline{L} - L$

Model

- Downward nominal stickiness in wage like in Schmitt-Grohé and Uribe (2016) or Eggertsson et al (2016)

$$W \geq \underline{W}$$

- The economy can be in two regimes: full employment ($L = \overline{L}$), or less than full employment, in which case $W = \underline{W}$
  - L-shaped Phillips curve

- The inflation rate in the nominal wage (or home good price) between 1 and 2 is equal to a target

$$\frac{W'}{W} = \Pi$$

Model

- Consumers can trade one-period real bonds (interest rate r)
- Taxes τ^m on imports, τ^x on exports, and three terms of trade,

$$S \equiv \frac{W}{P}, \; S^m \equiv \frac{S}{1+\tau^m} \text{ and } S^x \equiv (1+\tau^x)\, S$$

where P is offshore domestic currency price of global good

- Demand for home labor

$$L = \alpha_H \left(S^m\right)^{-\alpha_F} C + \left(S^x\right)^{-\gamma} C_F^W$$

where C_F^W is world demand for imports

- Net exports, or bond accumulation

$$B = \left(S^x\right)^{1-\gamma} C_F^W - \alpha_F \left(S^m\right)^{\alpha_H} C$$

Model

Three policies:

- monetary policy: nominal interest rate i
- trade policy: taxes τ^m and τ^x
- capital account policy: tax τ^b on external borrowing
  - could also be interpreted as reserves intervention with a closed capital account

Policies determine a unique allocation (Prop. 1)

$$S = \frac{1+i}{1+\tau^b}\frac{1}{(1+r)\,\Pi}$$

$$u'(C) = \beta\frac{1+i}{\Pi}(S^m)^{-\alpha_F}$$

"Exchange rate policy" involves both i and τ^b

Equivalence between exchange rate policy and trade policy

Lerner symmetry (Prop.2) Any allocation C, L, and B achieved by policy $(i, \tau^m, \tau^x, \tau^b)$ can also be achieved without export tax by policy $(i, \widetilde{\tau}^m, 0, \widetilde{\tau}^b)$ with $1 + \widetilde{\tau}^m = (1 + \tau^m)(1 + \tau^x)$ and $1 + \widetilde{\tau}^b = \left(1 + \tau^b\right) / (1 + \tau^x)$.

- Implication 1: trade policies that subsidize exports at the same rate as they tax imports can be replicated by the tax on capital flows
  - conditional equivalence between exchange rate manipulation and tariffs
- Implication 2: one of the two trade taxes is redundant

$$\tau^x = 0$$

Model

Comparative statics (if $\sigma < 1$) in a symmetric allocation with $\tau^m = \tau^b = 0$

	$i \nearrow$	$\tau^m \nearrow$	$\tau^b \nearrow$
S	$+$	0	$-$
C	$-$	$-$	$-$
L	$-$	$+$	$+$
B	$-$	$+$	$+$
U	$-$	$+$	$+$

Tariff on imports increases employment
Congruence between employment and welfare

Benchmark calibration

σ	γ	α_H	$\bar{L}$
0.5	3	0.6	1

The question

- Define $instruments_j$ subset of $\{i_j, \tau_j^n, \tau_j^b\}$
- Nash equilibrium between national social planners, each one solving

$$(P_j) \begin{cases} \max U_{r, C_F^W}(instruments_j), \\ L_{r, C_F^W}(instruments_j) \leq \overline{L} \end{cases}$$

subject to global market clearing conditions

$$\int B_j dj = 0$$

$$C_F^W = \alpha_F \int \left(S_j^m\right)^{\alpha_H} C_j dj$$

- Compare Nash equilibrium with global social planner who sets policies for the representative economy

Results

- Countries may have unemployment if the ZLB constraint $i_j \geq 0$ binds, which happens when global demand is low (β is high)
  - "global liquidity trap"
- The welfare gains from policy coordination depend on the instruments and on the level of global demand

Results

Trade war with high global demand: $instruments_j = \{i_j, \tau_j^m\}$; β is low enough for full employment with $i_j \geq 0$

- Nash equilibrium involves a positive tariff as each country tries to manipulate the terms of trade
- But the tariff is lower than in a static trade war with $\tau^m = (\gamma - 1)/\gamma$ (Johnson 1953)
  - because the tariff distorts consumption intertemporally
  - under benchmark calibration, the tariff is 7.3 percent
- The welfare cost of the trade war is small (less than 0.1 percent of consumption under benchmark calibration)

Results

Trade war with low global demand: $instruments_j = \{i_j, \tau_j^m\}$; with high β leading to binding ZLB and unemployment

- The tariff is used to increase employment
  - expenditure switching on the imports side
- This reduces demand for other countries' exports and lowers their employment
- The equilibrium tariff is higher ($\tau^m = \alpha_H(1/\sigma - 1)$=60%, Prop. 4) than when demand is high
- Welfare reduced by factor $(\alpha_F + \alpha_H/\sigma)^{\alpha_F \sigma}$=1.10
- The trade war lowers global employment

Results

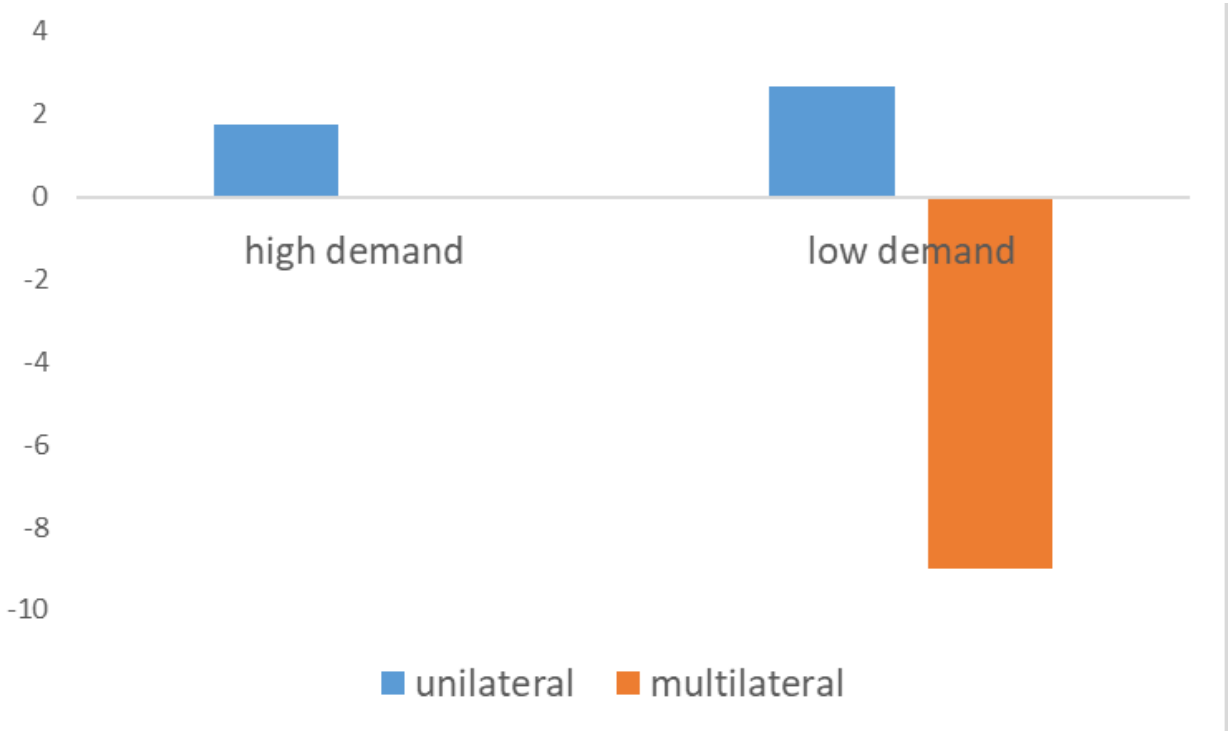

Figure: Impact of trade war on welfare (percentage point of consumption, benchmark calibration)

Results

Currency war with low global demand: $instruments_j = \{i_j, \tau_j^b\}$; with high β leading to binding ZLB and unemployment

- Mercantilism: increasing τ_j^b depreciates currency, raises net exports and employment, but reduces consumption
- If the rest of the world does not use capital controls, an individual country will go for mercantilism
- As the number of mercantilist countries increases, they receive a lower return on their assets
- Equilibrium?

Results

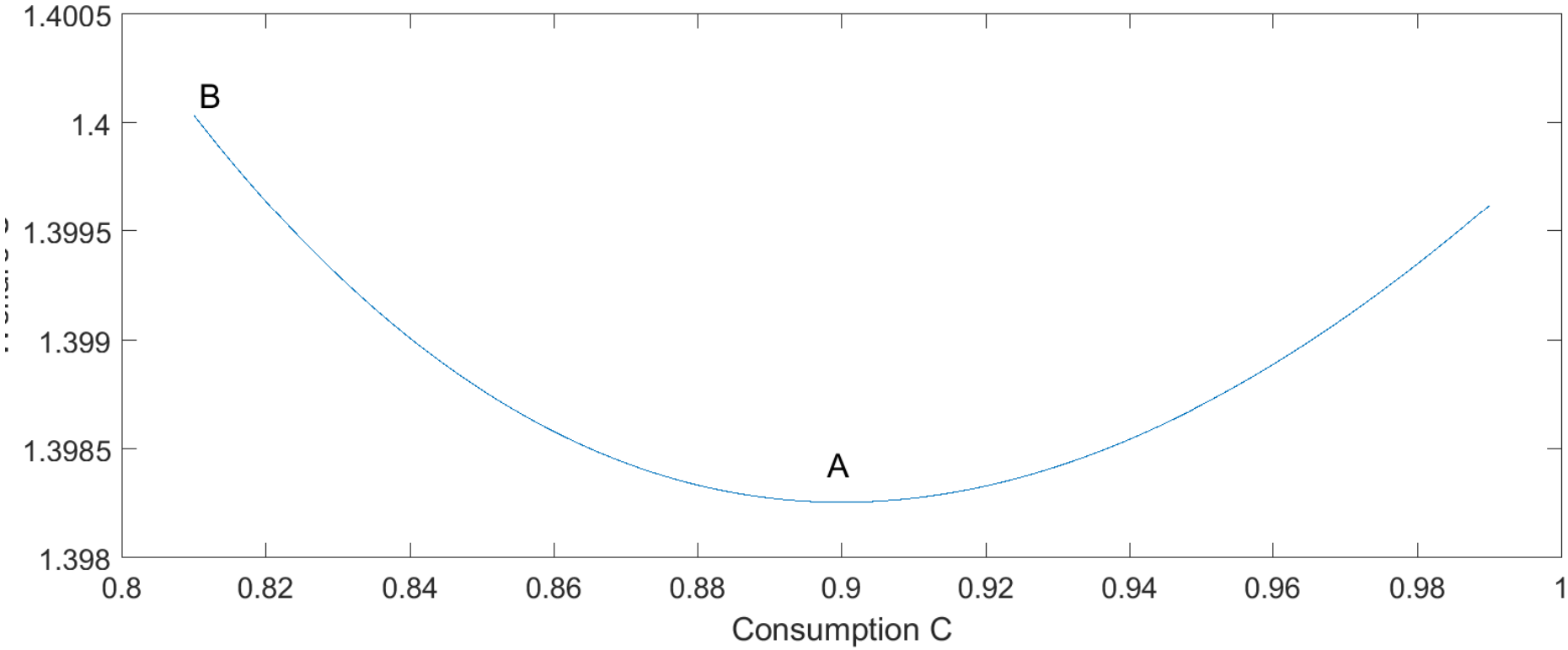

Figure: Variation of welfare with consumption (A=symmetric allocation, B= full employment)

Results

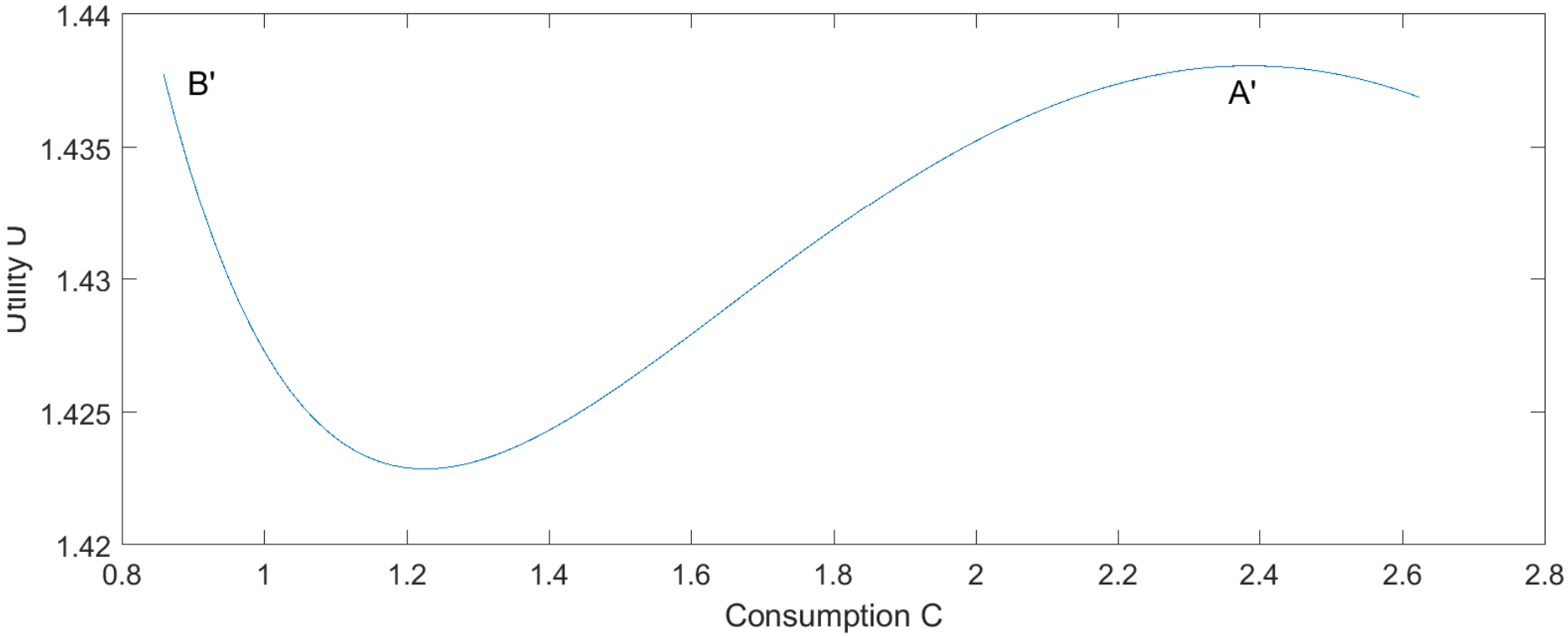

Figure: Variation of welfare with consumption in Nash equilibrium

Results

Symmetry breaking

- Under benchmark calibration there is no symmetric Nash equilibrium of currency war in i_j, τ_j^b when global demand is low
- The world endogenously divides itself between surplus countries and deficit countries having same welfare
- Surplus countries have competitive currency, full employment but invest foreign assets at low return
- Deficit countries have overvalued currency, unemployment but finance high consumption by borrowing at low interest rate
- Welfare of all countries is raised by currency war

Results

Currency wars through inflation target with low global demand:
$\Pi_j \in$ *instruments*$_j$; with high β leading to binding ZLB and unemployment

- Currency war through inflation targets is equivalent to removing ZLB constraint
- Raising Π_j in one country has beggar-thy-neighbor effects
- Raising Π_j in all countries raises global demand and welfare

Conclusions

The gains from international policy coordination are large to avoid trade wars when global demand is low

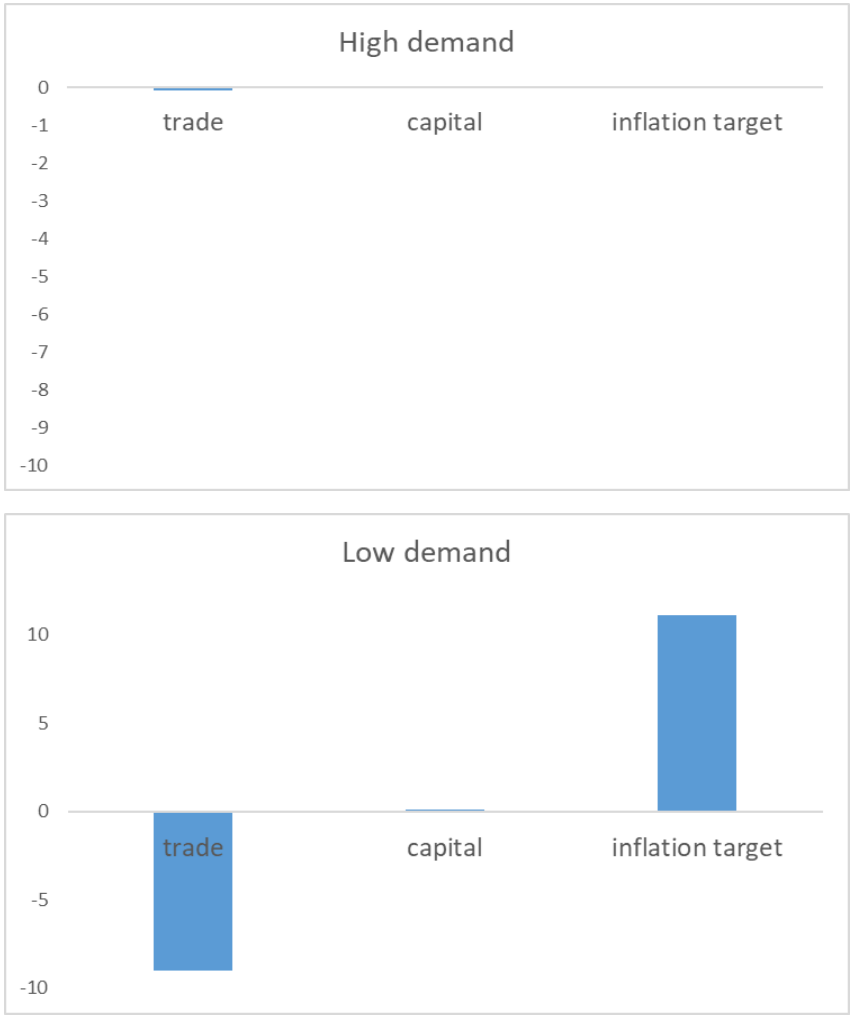

Figure: Impact of lack of coordination on welfare (percentage point of consumption)

Conclusions

Extensions

- Introduce country asymmetries to look at regional savings glut
- Make the model more dynamic (assuming $\tau_j^b \notin \mathit{Instruments}_j$)

THANK YOU