"I know nothing about the subject, but I'm happy to give you my expert opinion."
What Do GVCs Mean for Macroeconomic Policies?

M. Ayhan Kose
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Disclaimer! The views presented in this presentation are those of the author and do not necessarily reflect the views of the institutions he is affiliated with.
Three Questions

• What are the channels through which GVCs affect macroeconomic outcomes?

• What are the possible implications of GVCs for monetary policy?

• What type of model can help us understand these implications?
Three Questions

• What are the channels through which GVCs affect macroeconomic outcomes?
GVCs affect macro outcomes through multiple channels

• Exchange rate pass through

• Exchange rate elasticity of exports

• Transmission of cross-border shocks
Weaker exchange rate pass through?

The exchange rate pass through would be weaker in GVCs (relative to completely domestic production) due to changes in the cost of intermediary and factor inputs. Large and import-intensive firms have weaker exchange rate pass through since they naturally hedge through import prices and change profit margins instead of changing export prices (Amiti et al. 2015).

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**Pass-through by import intensity and market share**

Source: Amiti et al. (2015). Market shares represent the firm’s sector-destination-year specific export value divided by the sectors export value for the given destination and year. A high market share firm has a market share in the export market that is higher than average. Import intensity of a firm is defined as the ratio of total non-euro import value divided by total variable cost, average over time. A high import intensive firm has import intensity higher than the median.
Weaker impact of currency movements on exports?

**RER-export elasticity:** There has been a significant decline in exchange rate elasticity of exports over time (Ahmed, Appendino and Ruta 2015). The countries that are more tightly integrated in German supply chains experienced a much stronger flattening of the relationship between REER growth and export growth to Germany than those that are more loosely integrated in German supply chains.

**Real Exchange Rate Change Elasticity**

Source: Ahmed et al. (2015). These are the slopes on Real Effective Exchange Rate Change elasticity of manufacturing exports estimated for the different samples in the horizontal axis.
Stronger transmission of cross-border shocks and higher synchronization of cycles

- The relationship between trade intensity and business cycle synchronization depends on substitutability between traded goods.

- Trade in complements (substitutes) increases (decreases) business cycle synchronization between countries (Kose and Yi 2006, Burnstein et al. 2008, Giovanni and Levchenko 2010).

But also need to know to what extent external shocks affect output through GVCs..

Source: World Bank staff estimates. ; Note: Cumulated impulse responses of EM and global growth at the two-year horizon. The shock size is such that BRICS growth declines by one percentage point on impact. The shock size for China is calibrated such that its growth declines by exactly the same amount as BRICS at the end of two years. Solid bars denote the median and the error bars denote the 33-66 percent confidence bands.
Three Questions

• What are the channels through which GVCs affect macroeconomic outcomes?

• What are the possible implications of GVCs for monetary policy?
### GVCs: Changing nature of monetary policy transmission?

<table>
<thead>
<tr>
<th>Channels</th>
<th>Monetary policy</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Traditional trade</td>
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<tr>
<td>FX</td>
<td>Interest Rate -&gt; Exchange Rate -&gt; Exports -&gt; AD</td>
</tr>
<tr>
<td>Interest rate</td>
<td>Interest Rate -&gt; Investment -&gt; AD</td>
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<tr>
<td>Balance sheet</td>
<td>Interest Rate -&gt; Domestic Asset Prices -&gt; Balance Sheets -&gt; Investment -&gt; AD</td>
</tr>
<tr>
<td>Credit channel</td>
<td>Interest Rate -&gt; Credit Channel -&gt; Investment, Consumption -&gt; AD</td>
</tr>
<tr>
<td>Spillovers</td>
<td>Interest Rate -&gt; Domestic AD -&gt; Imports -&gt; Foreign AD</td>
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</tbody>
</table>
Three Questions

• What are the channels through which GVCs affect macroeconomic outcomes?

• What are the possible implications of GVCs for monetary policy?

• What type of model can help us understand these implications?
Wanted! A model to study monetary policy implications of GVCs - 1

- A multi-country DSGE model with cross-border input trade and nominal rigidities

- A three (or multi-) country, multi-sector international RBC model similar to Johnson (2014)

- Allowing cross border input trade (so analysis of GVCs possible): sector-level production takes a CES form using
  - the composite domestic factor inputs (a Cobb-Douglas function of capital and labor)
  - a composite of intermediate goods from other sectors and countries (aggregated with CES)
  - sector-specific productivity shocks
• Employ nominal frictions as standard DSGE models
  (Smets and Wouters 2007; Christiano, Eichenbaum, and Evans 2005).

• Analyze the following issues under high/low GVC integration (implement by adjusting elasticity parameters in CES aggregators of intermediate goods):
  • Impact of a domestic monetary policy shock
  • International spillovers through monetary policy and productivity shocks
Three Questions

• What are the channels through which GVCs affect macroeconomic outcomes?
  *exchange rate channel, transmission of shocks*

• What are the possible implications of GVCs for monetary policy?
  *likely affects the transmission channels of monetary policy*

• What type of model can help us understand these implications?
  *a DSGE model that has GVCs and clear role for policy*
What Do GVCs Mean for Macroeconomic Policies?

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“I would like to know how the macroeconomic model that I more or less believe can be reconciled with the trade models that I also more or less believe. [...] What we need to know is how to evaluate the microeconomics of international monetary systems. Until we can do that, we are making policy advice by the seat of our pants.”

regular exports and Northern output; and (3) positive link between the share of offshoring in Southern exports and output comovement, which holds when the extensive margins are free to adjust but not otherwise. Second, these implications also hold when the bivariate total factor productivity (TFP) process is re-calibrated to mirror the standard symmetric case for the United States and an aggregate of European economies as in Backus et al. (1992, henceforth BKK92), rather than the asymmetric process for the United States and Mexico estimated in this paper. Third, the results hold when key model variables and the exogenous TFP process are adjusted to take into account measurement issues that arise when comparing model implications to the data, such as the deflators for GDP and its components not reflecting changes in the number and composition of varieties (Burstein and Cravino, 2015), or the data series on investment not including expenditures related to firm entry (Fattal Jaef and Lopez, 2014).

1.1. Literature

This paper builds upon previous literature on business cycle synchronization, as it proposes a new mechanism of output comovement that hinges on the link between firm entry in the home economy and the extensive margin of offshoring in a framework with heterogeneous firms. The mechanism differs from others proposed in the literature, such as those relying on a low elasticity of substitution between country-specific goods or dependence on imported inputs under vertical specialization (BKT08; Arkoalakis and Ramanarayanan, 2009). For instance, BKT08 propose a model in which offshoring enhances output comovement but the location of production is fixed over time. In their model, comovement results from a very low elasticity of substitution between the country-specific goods in the offshoring sector, which is set to be lower than in the regular exports sector. In contrast to BKT08, the positive relationship between offshoring and output comovement in my model is due to the asymmetric role of the extensive margin in driving the Southern offshoring vs. regular exports, which makes the former more procyclical than the latter, while the elasticity of substitution is the same for both sectors. Bergin et al. (2011) also study the importance of offshoring in amplifying the transmission of shocks across countries in a model that allows for extensive margin adjustments. While they study the implications of offshoring for the transmission of shocks across countries, my paper focuses on the implications of offshoring for output comovement.

This paper also adds to literature that studies the role of the extensive margin in shaping export dynamics; however, this literature generally looks at regular exports rather than at trade flows resulting from vertical FDI. For example, GM05 model export dynamics in a framework with endogenous firm entry, heterogeneous firms, and endogenous exports that generates persistent deviations from purchasing power parity and rationalizes the

Fig. 1. Business cycle properties of offshoring to Mexico. Note: The data series are from Federal Reserve Board (for the U.S. manufacturing IP and U.S. real GDP), INEGI (for Mexico’s manufacturing IP, real GDP, the maquiladora real value added, and the number of establishments), and the International Financial Statistics via Haver Analytics (for Mexico’s maquiladora and non-maquiladora exports in dollars, deflated by PPI). The series are seasonally adjusted, converted in natural logs, and expressed in deviations from a Hodrick–Prescott trend. The shaded areas represent the U.S. recessions during 1990:Q3–1991:Q1 and 2001:Q1–2001:Q4, as defined by the NBER. If the U.S. and Mexico’s real GDP are used instead of manufacturing IP, the correlations are largely similar: 0.54 and 0.45 for the U.S. GDP with the maquiladora value added and Mexico’s GDP; 0.34 for the U.S. GDP with the number of maquiladora establishments; 0.55 and 0.34 for the U.S. GDP with Mexico’s maquiladora and non-maquiladora real exports, respectively.
shock; their action is driven by the cost advantage of producing offshore, rather than by changes in demand. In contrast, as firm entry increases the number of varieties available in the North, the Northern demand shifts away from Southern exports, which causes some of the Southern firms to stop exporting.

Compared with the extreme case with no offshoring (dashed lines in Fig. 4), which revisits the model in GM05, the offshoring exports boost the Southern total exports and output. Following the positive shock to productivity in the North, the Southern total exports and output in the baseline model persist above those from GM05 in the quarters after the shock.28

4.1.2. Fixed cutoffs

In the case with fixed offshoring and exporting cutoffs (dashed lines in Fig. 5) the extensive margin still shapes the pattern of the Southern offshoring exports. Following firm entry in the North, the new firms with idiosyncratic productivity above the cutoff start by producing directly offshore. Thus, the number of offshoring firms increases gradually in the quarters after the shock, mirroring the build-up in the stock of firms in the North, even though less than in the baseline case. The value added per offshoring firm (the intensive margin) spikes on impact, then declines below its steady state, but not enough to offset the boost to offshoring exports provided by the extensive margin. Hence, the offshoring exports persist above their steady state, unlike the Southern regular exports that dip below.29

Turning to the Southern regular exports, the case with fixed cutoffs results in a smaller adjustment in the number of Southern exporters (the extensive margin), which mirrors the slow-moving stock of Southern firms, but to a larger adjustment in the regular exports per firm (the intensive margin) than in the baseline case. In fact, the intensive margin in the case with fixed cutoffs (solid lines in Fig. 5) resembles the extensive margin from the baseline case (solid lines). As the Northern demand for Southern varieties rises on impact but declines in the quarters after the shock, some of the Southern firms would choose to stop exporting. Instead, if exit from exporting is not an option, exporters reduce the volume of exports per firm, since both the extensive and intensive margins of regular exports are driven by demand. Thus, unlike for offshoring exports, the Southern regular exports behave similarly with or without a flexible extensive margin. The result is consistent with the findings in Alessandria and Choi (2007) and Fattal Jaef and Lopez (2014).

4.1.3. Fixed extensive margins

To entirely shut down the extensive margins, I fix both firm entry and the cutoffs for offshoring and exporting (dashed lines in Fig. 6). When the extensive margins are held fixed, the Southern offshoring and regular exports display identical impulse responses, since differences in the behavior of their extensive margins no longer affect the volume of each type of exports. Also, the offshoring exports rise by less on impact and persist below their path from the baseline case, which highlights the role of the extensive margin in enhancing the procyclical response of the Southern offshoring exports relative to that of regular exports.

4.1.4. Fixed entry

The alternative model in which firm entry is fixed (but the cutoffs are free to adjust) provides another illustration of the role of the extensive margin in shaping the pattern of offshoring exports (thin lines in Fig. 6). Since the positive shock to productivity in the North is not followed by firm entry, the terms of labor depreciate (rise) on impact; while the cost of effective labor is unchanged in the North, it rises in the South due to the higher Northern demand for Southern varieties. Therefore, the number of offshoring firms drops on impact and persists below its steady state. In turn, the countercyclical
in the offshoring sector than in the regular exports sector. In contrast, in my model, the elasticity of substitution is the same across the two sectors; the link between offshoring and output comovement arises from the asymmetric impact of Northern firm entry on the Southern offshoring and regular exports through their extensive margins.

5. Conclusion

This paper examines the effect of offshoring motivated by lower production costs on the cross-country transmission of business cycles in a model with endogenous firm entry, heterogeneous firms, and endogenous offshoring. The model generates a procyclical pattern of offshoring and its extensive margin relative to output in the home economy, offshoring exports that are more procyclical than the regular exports, and a positive relationship between the share of offshoring in exports and output comovement, as in the data. The mechanism of comovement arises from the link between firm entry in the home economy, the appreciation of the terms of labor, and the firms’ decision to produce offshore.

The model proposed here allows for the study of a number of additional implications of offshoring, including the effect on labor market outcomes in the home and foreign economies, and the behavior of real exchange rates when offshoring transfers upward pressure on foreign wages and prices. Nonetheless, the interaction between offshore production and international labor mobility in a framework that distinguishes between tradable and non-tradable sectors represents a topic with rich policy implications.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.jinteco.2016.01.004.

References


Fig. 7. Offshoring and output comovement. Note: “Fixed extensive margins” refers to the model with fixed firm entry and fixed cutoffs for offshoring and exporting. The alternative calibrations vary the share of offshoring in Southern exports (on the horizontal axis) while keeping the ratio of exports to GDP in the North and the South close to their steady-state levels from the baseline model.
### TABLE 7: TRADE INTEGRATION AND GDP COMOVEMENT

<table>
<thead>
<tr>
<th></th>
<th>Trade GDP = 0.1</th>
<th>Trade GDP = 0.2</th>
<th>Trade GDP = 0.35</th>
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<tbody>
<tr>
<td>Historical Rule</td>
<td>0.36</td>
<td>0.45</td>
<td>0.49</td>
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<tr>
<td>Peg</td>
<td>0.05</td>
<td>0.19</td>
<td>0.27</td>
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<tr>
<td>Ramsey</td>
<td>0.07</td>
<td>0.29</td>
<td>0.43</td>
</tr>
<tr>
<td>Nash</td>
<td>0.28</td>
<td>0.35</td>
<td>0.48</td>
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</tbody>
</table>

### TABLE 8: TRADE INTEGRATION – NON STOCHASTIC STEADY STATE

#### Relative Gain from Coordination* —PCP

<table>
<thead>
<tr>
<th></th>
<th>Optimal Rule*</th>
<th>Historical Rule</th>
<th>Peg</th>
<th>Nash</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Leader</td>
<td>Follower</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade GDP = 0.1</td>
<td>0.88%</td>
<td>18.62%</td>
<td>18.81%</td>
<td>43.45%</td>
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<tr>
<td>Trade GDP = 0.2</td>
<td>3.13%</td>
<td>25.36%</td>
<td>26.90%</td>
<td>45.40%</td>
</tr>
<tr>
<td>Trade GDP = 0.35</td>
<td>3.15%</td>
<td>29.69%</td>
<td>32.31%</td>
<td>48.39%</td>
</tr>
</tbody>
</table>

#### Relative Gain from Coordination* —LCP

<table>
<thead>
<tr>
<th></th>
<th>Optimal Rule**</th>
<th>Historical Rule</th>
<th>Peg</th>
<th>Nash</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Leader</td>
<td>Follower</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade GDP = 0.1</td>
<td>2.17%</td>
<td>20.91%</td>
<td>20.89%</td>
<td>44.90%</td>
</tr>
<tr>
<td>Trade GDP = 0.2</td>
<td>2.66%</td>
<td>29.09%</td>
<td>29.49%</td>
<td>47.34%</td>
</tr>
<tr>
<td>Trade GDP = 0.35</td>
<td>3.16%</td>
<td>36.16%</td>
<td>37.00%</td>
<td>51.97%</td>
</tr>
</tbody>
</table>

*Gains are the ratio of welfare costs of business cycle under the Ramsey-optimal policy and the alternative;**The optimal rule is derived under weak trade linkages (10%) and producer currency pricing (PCP); the rule is kept constant across trade regimes and under local currency pricing (LCP).
### TABLE 5: BUSINESS CYCLE STATISTICS

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\sigma_{X^U_R}$</th>
<th>$\sigma_{Y^U_R}$</th>
<th>$\sigma_{X^U_R}/\sigma_{Y^U_R}$</th>
<th>1st Autocorr</th>
<th>$corr(X^U_{R,t}, Y^U_{R,t})$</th>
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</thead>
<tbody>
<tr>
<td>$Y_R$</td>
<td>1.71</td>
<td>1.50</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>$C_R$</td>
<td>1.11</td>
<td>0.94</td>
<td>0.64</td>
<td>0.63</td>
<td>0.73</td>
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<tr>
<td>$I_R$</td>
<td>5.48</td>
<td>5.50</td>
<td>3.20</td>
<td>3.68</td>
<td>0.89</td>
</tr>
<tr>
<td>$l$</td>
<td>0.97</td>
<td>0.82</td>
<td>0.56</td>
<td>0.56</td>
<td>0.88</td>
</tr>
<tr>
<td>$w_R$</td>
<td>0.91</td>
<td>0.79</td>
<td>0.52</td>
<td>0.53</td>
<td>0.91</td>
</tr>
<tr>
<td>$X_R$</td>
<td>5.46</td>
<td>2.40</td>
<td>3.18</td>
<td>1.66</td>
<td>0.70</td>
</tr>
<tr>
<td>$I_R$</td>
<td>4.35</td>
<td>2.08</td>
<td>2.54</td>
<td>1.39</td>
<td>0.69</td>
</tr>
<tr>
<td>$TB_R/Y_R$</td>
<td>0.25</td>
<td>0.39</td>
<td>0.14</td>
<td>0.26</td>
<td>0.43</td>
</tr>
<tr>
<td>$corr(C_{R,t}, C^*_R)$</td>
<td>0.44</td>
<td>0.16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$corr(Y_{R,t}, Y^*_R)$</td>
<td>0.51</td>
<td>0.26</td>
<td></td>
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</tr>
</tbody>
</table>

Bold fonts denote data moments, normal fonts denote model generated moments.

### TABLE 6: TRADE INTEGRATION – NON STOCHASTIC STEADY STATE

<table>
<thead>
<tr>
<th>$\frac{Trade}{GDP}$</th>
<th>Ramsey Gain</th>
<th>Ramsey Inflation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td>0.34%</td>
<td>1.40%</td>
</tr>
<tr>
<td>0.2</td>
<td>0.22%</td>
<td>1.20%</td>
</tr>
<tr>
<td>0.35</td>
<td>0.16%</td>
<td>1.05%</td>
</tr>
</tbody>
</table>
in Fig. 1, an increase in Home productivity generates Foreign expansion through trade linkages, as demand-side complementarities more than offset the effect of resource shifting to the more productive economy. (This is true also with higher shock persistence than for the example of Fig. 1.) Moreover, absent technology spillovers, Foreign consumers have weaker incentives to increase consumption on impact, which reduces the cross-country consumption correlation.44

5. Market reforms and monetary policy in the international economy

Having established that the model successfully reproduces (qualitatively and/or quantitatively) several features of the international business cycle, we turn to our main exercise and study the domestic and international consequences of market reforms in one of the countries in our model, and how such reforms affect the conduct of optimal monetary policy.

We calibrated both countries in the model to U.S. targets to assess the model’s properties. A goal of our exercise in this paper is to begin shedding light on how market reforms in Europe are likely to affect transatlantic interdependence and policy incentives for the Federal Reserve and the ECB. For this purpose, we isolate structural conditions of product and labor markets as the only source of asymmetry between the euro area and the U.S. in our model. We accomplish this by recalibrating the parameters that capture Home market regulation (the entry cost in product markets, $f_e$; unemployment benefits, $b$; and the flexible-wage bargaining power of workers, $1 - \eta$, taken as a measure of employment protection) to European levels (see the Appendix for details).45 This adjustment in parameter values allows us to treat the Home country as a model-euro area that differs from the U.S. only by featuring more rigid product and labor markets, and to isolate the consequences of this asymmetry and of reforms that align European market characteristics to U.S. levels.

Under the new calibration, we compute the welfare benefit of moving from the historical policy behavior of the calibration in Table 1 to the Ramsey-optimal cooperative monetary policy, as well as the cooperative, Ramsey-optimal, long-run inflation rates in the two countries. These results are reported in Table 3, in the “Status quo” row. We then compute impulse responses to Home product market reform (Fig. 2), Home labor market reform (Fig. 3), and joint reform of both Home markets (Fig. 4). Each Home market reform brings the relevant parameter value(s) to the flexible (U.S.) level used in the previous section. The parameter change is treated as a permanent shock, and the impulse responses trace the domestic and international effects of this change from the impact period to the long run, under historical policy or the cooperative, Ramsey-optimal policy.46

44 The very low correlation of consumption across countries in Table 2 is due to the combination of incomplete markets, bond adjustment costs (albeit small), and extremely persistent shocks. Reducing shock persistence facilitates risk sharing and increases consumption correlation, consistent with results in Baxter and Crucini (1995).

45 For our purposes, changing directly the value of $f_e$ is sufficient to capture changes in product market regulation. The underlying assumption is that the change comes from a change in the "red tape" portion $f_e$ of the overall entry cost rather than in the technological requirement $f_T$.

46 In the Ramsey policy problem for this exercise, we assume that the initial conditions are given by the rigid steady state under the historical policy (which features zero inflation). In technical terms, we solve for the Ramsey-optimal policy in response to market deregulation assuming time-zero commitment to the optimal plan. An alternative approach would be to solve for the optimal response to reform assuming that the initial conditions are given by the optimal Ramsey steady state with high product and labor market regulation, i.e., from a timeless perspective. Our choice has the advantage of making the comparison between historical and Ramsey-optimal policy more transparent. (In the presence of different initial conditions associated to...
Since much of the policy debate on the benefits of market reforms focuses on the benefits they would generate by reallocating resources to more efficient uses, for each reform, we also present figures that make it possible to study such reallocation effects. Specifically, part b of Figs. 2–4 shows the responses of three measures of productivity and employment across different uses of resources in production. In our model economy, it is possible to define the productivity of the average Home product-variety line, whose output is sold both domestically and abroad, as

\[
\tilde{z}_t = \left( \tilde{z}_d^{\varphi-1} + \left( \frac{\tilde{z}_x}{\tau} \right)^{\varphi-1} \frac{N_{x,t}}{N_{d,t}} \right)^{1/(\varphi-1)}.
\]

The first row of each b-figure shows the responses to reform of this average productivity, of the average productivity of

(footnote continued) alternative monetary policy regimes, as implied by the alternative approach, it would be impossible to isolate the role of monetary policy for the transition dynamics following reforms.)
monopoly power on labor supply just as in the benchmark New Keynesian model without producer entry. The additional distortions introduced in our model imply the optimality of positive long-run inflation.49

Specifically, the Ramsey policymaker must trade the beneficial welfare effects of reducing these steady-state distortions against the costs of non-zero inflation implied by distorting the product creation margin, allocating resources to wage and price changes, and by the departure from the Hosios condition that is induced also in Foreign by having positive inflation. Compared to the zero inflation outcome, the Ramsey authority reduces the inefficiency wedge in job creation implied by the distortions. The choice of a higher inflation rate for the Home country reflects its more distorted nature, and therefore the higher desirability of inflation to close inefficiency gaps in this country.50

The finding of optimal positive long-run inflation is in contrast with the prescription of zero (or near zero) target inflation delivered by the vast majority of New Keynesian models in closed and open economy. While the costs of inflation outweigh the benefits of reducing other distortions in those models, this is no longer the case with a richer microfoundation of labor markets. In particular, the prescription of an optimal positive long-run inflation stems from the presence of wage stickiness and search and matching frictions in the labor market. Wage stickiness allows the Ramsey authority optimally to manipulate bargaining power to reduce inefficiencies in job creation. Absent sticky wages, a policy of zero long-run inflation would be optimal also in our model, as positive inflation would no longer shift effective bargaining power in favor of firms, and zero inflation would preserve efficiency along the product creation margin, confirming the result in Bilbiie et al. (2014). Optimal, cooperative policy requires deviations from price stability also over the business cycle (these deviations are amplified if regulation is high in both countries). Historical policy approximates price stability in our model, while Ramsey-optimal policy lets price inflation move more significantly in response to shocks. (Figures are available on request.) Ramsey-optimal policy lowers the cost of the cycle more significantly for Home than for Foreign—again consistently with the fact that inflation is more desirable in the more rigid country.

5.2. The dynamic effects of market reforms and monetary policy during the transition

We begin by discussing the effects of reforms under the historical policy (solid lines in the figures). Fig. 2 shows that Home product market reform that induces more investment in business creation (increased producer entry) at Home causes

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49 Bilbiie et al. (2014) and Cacciatore et al. (2013) find that the optimal inflation target rises in the presence of standard forms of price and wage indexation. The reason is that indexation lowers the welfare cost associated with a given long-run inflation rate, and it requires larger inflation to achieve a given change in long-run markup and bargaining power of firms.

50 In Cacciatore et al. (2013), the central bank of a monetary union is constrained to choosing a single long-run inflation target for the two countries in union. When these differ in the extent to which inflation is desirable, the central bank must trade off this difference between Home and Foreign in determining its policy. The worldwide Ramsey central bank of this paper does not face this constraint as a flexible exchange rate allows it to set different targets for the two countries even in the fully cooperative scenario we consider.
Are GVCs Macro Relevant?

Martin Kaufman
Assistant Director
Strategy, Policy and Review Department
IMF
Do GVCs matter for...?

- ER elasticities
- Competitiveness
- Spillovers
ER Elasticities

Source: IMF
Poland, Hungary, Czech Republic and Slovakia - Exports to Germany

96-03: $y = -1.52x + 16.60$
$R^2 = 0.21$

04-12: $y = -0.24x + 4.55$
$R^2 = 0.01$

Sources: Ahmed, Appendino and Ruta (2015)
Bulgaria, Latvia, Lithuania, Romania and Slovenia - Exports to Germany

Sources: Ahmed, Appendino and Ruta (2015)
Percentage Decline in Elasticity

Sources: Ahmed, Appendino and Ruta (2015)
GVCs and Competitiveness

Figure 10: Real Effective Exchange Rates for China and United States, 1995-2011

Note: VAREER weights are based on final demand and production elasticities $\{\sigma, \gamma, \rho\} = \{1, 1, 1\}$.
IOREER weights are based on final demand and production elasticities $\{\sigma, \gamma, \rho\} = \{3, 0, 0\}$. The level of the log REERs is normalized to zero in 1995. Data from WIOD.

Sources: Bems and Johnson (2015)
Figure 9: Real Effective Exchange Rates for Select EMU Countries, 1995-2011

Sources: Bems and Johnson (2015)
Figure 4: REER Weights Assigned to China and South Korea, 2004

Weights assigned to CHN

Weights assigned to KOR

Note: VAREER weights are based on final demand and production elasticities \( \{\sigma, \gamma, \rho\} = \{1, 1, 1\} \). IOREER weights are based on final demand and production elasticities \( \{\sigma, \gamma, \rho\} = \{2.9, 0, 0\} \). Data from GTAP.

Sources: Bems and Johnson (2015)
GVCs and Spillovers through Trade Channel

China has become an important trade partner for most EMs...
But list is much longer...

• GVCs: role of macro environment (e.g., German supply chain: E vs. S)?
• What does comparative advantage mean with production fragmentation? Is H-O-V dead?
• Do GVCs accelerate catch up? Increased complementarities/benefits with structural reforms?
• GVCs and new trade policy frontiers