Online Appendix

"International Trade and Intertemporal Substitution"

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Contents

1 Baseline and Static Models

In this section, we report additional findings corresponding to the baseline and static model examined throughout the paper. Tables 1-3 report the parameterizations underlying the results examined throughout the paper.[1] Table 4 reports the price and income elasticities implied by these economies. Table 5 reports the implications of these models for additional business cycle moments discussed in the literature and not reported in the paper. Table 6 reports the implications of these models for real exchange rate dynamics.

1.1 Parameterization

Table 1: Baseline and Static Models – Predetermined Parameters

A. Predetermined Parameters

Parameter		*Baseline*	*Static*
Intertemporal elasticity of substitution	$1/\gamma$	0.50	0.50
Share of consumption in utility	μ	0.34	0.34
Share of capital in production	θ	0.36	0.36
Depreciation rate	δ	0.025	0.025
Share of imports that arrive today	φ	0.63	1.00

Table 2: Baseline and Static Models – Estimated Parameters

B. Estimated Parameters

Parameter		*Baseline*	*Static*
Elasticity of substitution	σ	1.297	1.297
Capital adjustment cost	η_k	1.961	1.526
Bond adjustment cost	η_b	0.846	0.639
Trade cost	τ	69.235	71.974
Discount factor	β	0.976	0.978
Surplus consumption autocorrelation	ρ_s	0.618	0.885
S.S. surplus consumption	$\bar{s}$	0.00048	0.00160
Moment	*Data*	*Baseline*	*Static*
Empirical price elasticity	-0.315	-0.326	-1.297
Std. Dev. Investment / Std. Dev. GDP	3.119	3.084	3.085
Std. Dev. NX/GDP	1.113	1.106	1.127
Imports / Absorption	0.219	0.220	0.219
Avg. Realized SDF	0.988	0.998	0.999
Std. Dev. Realized SDF	0.220	0.223	0.216
corr(Realized SDF, Absorption)	0.102	0.108	0.100

[1] We estimate the static model keeping the elasticity of substitution σ unchanged at its baseline value (1.316). Thus, we do not target the empirical price elasticity when estimating the static model.

Table 3: Baseline and Static Models – Estimated Parameters

C. Estimated Parameters, Stochastic Process for $\{z, p_y, p_x\}$

Parameter	*Baseline*	*Static*	*Moment*	*Data*	*Baseline*	*Static*
$\rho_{z,z}$	0.660	0.630	$\text{corr}(A_t, A_{t-1})$	0.881	0.980	0.977
ρ_{z,p_y}	-0.336	-0.333	$\text{corr}(A_t, p_{y,t-1})$	-0.282	-0.302	-0.280
ρ_{z,p_x}	-0.732	-0.719	$\text{corr}(A_t, p_{A,t-1})$	-0.603	-0.607	-0.599
$\rho_{p_y,z}$	0.303	0.332	$\text{corr}(p_{y,t}, A_{t-1})$	-0.002	-0.002	-0.002
ρ_{p_y,p_y}	0.987	0.984	$\text{corr}(p_{y,t}, p_{y,t-1})$	0.910	0.962	0.934
ρ_{p_y,p_x}	0.000	0.000	$\text{corr}(p_{y,t}, p_{A,t-1})$	0.224	0.224	0.217
$\rho_{p_x,z}$	-0.026	-0.026	$\text{corr}(p_{A,t}, A_{t-1})$	-0.520	-0.535	-0.540
ρ_{p_x,p_y}	0.080	0.081	$\text{corr}(p_{A,t}, p_{y,t-1})$	0.629	0.653	0.658
ρ_{p_x,p_x}	0.997	0.990	$\text{corr}(p_{A,t}, p_{A,t-1})$	0.904	0.954	0.953
Std. dev. ν_z	0.0018	0.0002	Std. dev. (A_t)	0.025	0.022	0.026
Std. dev. ν_y	0.0035	0.0069	Std. dev. $(p_{y,t})$	0.032	0.029	0.031
Std. dev. ν_x	0.0014	0.0001	Std. dev. $(p_{A,t})$	0.009	0.008	0.009
$\text{corr}(\nu_z, \nu_{p_y})$	0.0463	0.0259	$\text{corr}(A_t, p_{y,t})$	-0.154	-0.160	-0.162
$\text{corr}(\nu_z, \nu_{p_x})$	-0.997	-0.996	$\text{corr}(A_t, p_{A,t})$	-0.609	-0.595	-0.597
$\text{corr}(\nu_{p_y}, \nu_{p_x})$	0.0307	0.0594	$\text{corr}(p_{y,t}, p_{A,t})$	0.442	0.459	0.474

1.2 Results

Table 4: Baseline and Static Models – Import Elasticities

	Price Elasticity	*Income Elasticity*
Data	-0.315	1.602
Time-to-Ship Model, Baseline	-0.326	1.243
No Time-to-Ship Model	-1.297	1.000

Table 5: Baseline and Static Models – Other Business Cycle Moments

	Data	*Baseline*	*Static*
σ(GDP)	2.090	3.064	3.305
σ(C)/σ(GDP)	0.990	0.306	0.341
corr(GDP_t,GDP_{t-1})	0.830	0.976	0.976
corr(GDP_t,C_t)	0.760	0.544	0.604
corr(GDP_t,I_t)	0.790	0.962	0.946
corr(GDP_t,NX_t)	-0.110	0.678	0.629
σ(TOT)	1.850	3.322	3.613
corr(TOT_t,TOT_{t-1})	0.790	0.964	0.940
corr(TOT_t,NX_t)	-0.150	-0.244	-0.195
corr(TOT_t,GDP_t)	0.002	0.165	0.179

Table 6: Baseline and Static Models – Real exchange rate dynamics

	Data	*Baseline*	*Static*
Std. dev. RER	0.936	1.046	0.892
corr(RER_t,RER_t)	0.904	0.961	0.954
corr(RER_t,GDP_t)	0.305	0.781	0.675
corr(RER_t,NX_t/GDP_t)	-0.611	0.678	0.857

Note: Real exchange rate computed as $1/P_t$, where P_t is the absorption price index.

1.3 Estimates of Extended Import Demand Specifications

In this section, we estimate the empirical price and income elasticities under alternative specifications and contrast them with their model-counterparts. As in the paper, we also control for durable goods and inventories. The results are reported in Table 7.

First, we extend the estimated specification to control for the realized SDF (second row of the table). Then, we extend it to control for the realized returns to a risk-free bond (in the data, we measure it as the realized return to a 90-day U.S. government bond); see the estimation results in the third row of this table. We also report the income and price elasticities implied by our model when controlling for the expected SDF and for the expected real bond returns; see the fourth and fifth rows of the table.

Finally, we recompute the empirical and model-implied price and income elasticities using an alternative specification of the import demand equation featuring domestic absorption instead of aggregate absorption (for both quantities and prices).

Table 7: Extended Import Demand Equation

	Data		*Model*	
	Price Elasticity	*Income Elasticity*	*Price Elasticity*	*Income Elasticity*
Baseline	-0.315	1.602	-0.326	1.243
Control for **realized** SDF	-0.321	1.586	-0.333	1.241
Control for realized real return to bond	-0.321	1.596	-0.352	1.194
Control for **expected** SDF	–	–	-1.101	0.986
Control for expected real return to bond	–	–	-0.410	1.107
Domestic absorption	-0.13	1.20	-0.346	1.296

2 No Habits and Alternative Stochastic Process

In this section, we investigate two alternative parameterizations of the baseline model.

First, we consider an economy without habits such as the one studied in Section 7 of the paper. However, in contrast to the economy discussed in the paper, here we recalibrate the economy without habits according to the approach discussed in Section 5 of the paper, except that we do not target the SDF moments and we keep the elasticity of substitution σ predetermined at its baseline value (1.32).

Second, we consider an economy that can account for all target moments except for the joint dynamics of absorption and prices; this is the "alternative stochastic process" economy examined in Section 7 of the paper. We estimate the parameters of this economy following the same approach described in Section 5 of the paper, except for two differences. First, we do not target the joint dynamics of absorption and prices. Second, we target a unit income elasticity and a price elasticity equal to σ. We show that this economy implies income and price elasticities close to those of the static model. As discussed in more detail in the paper, this finding shows that estimating the stochastic process to match the joint dynamics of absorption and prices observed in U.S. is important for the findings reported in the paper.

The tables in the following subsections report the results. Tables 8-10 report the parameterizations of these economies. Table 11 reports the price and income elasticities implied by these economies.

2.1 Parameterization

Table 8: Habits and VAR Process – Predetermined Parameters
A. Predetermined Parameters

Parameter		*No Habits*	*Alt. VAR*
Intertemporal elasticity of substitution	$1/\gamma$	0.50	0.50
Share of consumption in utility	μ	0.34	0.34
Share of capital in production	θ	0.36	0.36
Depreciation rate	δ	0.025	0.025
Elasticity of substitution	σ	1.32	1.32
Share of imports that arrive today	φ	0.63	0.63

Note: σ is predetermined at its baseline value (1.32).

Table 9: Habits and VAR Process – Estimated Parameters

B. Estimated Parameters

Parameter		*No Habits*	*Alt. VAR*
Capital adjustment cost	η_k	0.089	0.231
Bond adjustment cost	η_b	0.143	0.259
Trade cost	τ	68.885	67.187
Discount factor	β	0.973	0.958
Surplus consumption autocorrelation	ρ_s	—	0.966
S.S. surplus consumption	$\overline{s}$	—	0.02005
Moment	*Data*	*No Habits*	*Alt. VAR*
Std. Dev. Investment / Std. Dev. GDP	3.119	3.100	3.119
Std. Dev. NX/GDP	1.113	1.135	1.113
Imports / Absorption	0.219	0.219	0.221
Avg. Realized SDF	0.988	0.973	0.989
Std. Dev. Realized SDF	0.220	0.004	0.220
corr(Realized SDF, Absorption)	0.102	-0.111	0.102

Table 10: Habits and VAR Process – Estimated Parameters

C. Estimated Parameters, Stochastic Process for $\{z, p_y, p_x\}$

Parameter	*No Habits*	*Alt. VAR*	*Moment*	*Data*	*No Habits*	*Alt. VAR*
$\rho_{z,z}$	0.749	0.534	$\text{corr}(A_t, A_{t-1})$	0.881	0.945	0.993
ρ_{z,p_y}	-0.215	-0.049	$\text{corr}(A_t, p_{y,t-1})$	-0.282	-0.283	0.587
ρ_{z,p_x}	-0.781	-0.513	$\text{corr}(A_t, p_{A,t-1})$	-0.603	-0.836	-0.623
$\rho_{p_y,z}$	0.232	0.206	$\text{corr}(p_{y,t}, A_{t-1})$	-0.002	-0.003	0.655
ρ_{p_y,p_y}	0.866	0.914	$\text{corr}(p_{y,t}, p_{y,t-1})$	0.910	0.937	0.996
ρ_{p_y,p_x}	0.000	0.000	$\text{corr}(p_{y,t}, p_{A,t-1})$	0.224	0.265	-0.318
$\rho_{p_x,z}$	0.018	-0.025	$\text{corr}(p_{A,t}, A_{t-1})$	-0.520	-0.586	-0.506
ρ_{p_x,p_y}	0.043	0.033	$\text{corr}(p_{A,t}, p_{y,t-1})$	0.629	0.501	-0.188
ρ_{p_x,p_x}	0.96220	0.99852	$\text{corr}(p_{A,t}, p_{A,t-1})$	0.904	0.878	0.947
Std. dev. ν_z	0.0000	0.0020	Std. dev. (A_t)	0.025	0.029	0.054
Std. dev. ν_y	0.0108	0.0081	Std. dev. $(p_{y,t})$	0.032	0.027	0.167
Std. dev. ν_x	0.0046	0.0209	Std. dev. $(p_{A,t})$	0.009	0.009	0.055
$\text{corr}(\nu_z, \nu_{p_y})$	0.9611	-0.0087	$\text{corr}(A_t, p_{y,t})$	-0.154	-0.176	0.622
$\text{corr}(\nu_z, \nu_{p_x})$	0.0954	-0.8683	$\text{corr}(A_t, p_{A,t})$	-0.609	-0.753	-0.576
$\text{corr}(\nu_{p_y}, \nu_{p_x})$	-0.1836	-0.0061	$\text{corr}(p_{y,t}, p_{A,t})$	0.442	0.421	-0.251

2.2 Results

Table 11: Habits and VAR Process – Import Elasticities

	Price Elasticity	*Income Elasticity*
Data	-0.315	1.602
Baseline	-0.326	1.243
No Habits	-1.350	1.007
Alt. VAR Process	-1.292	1.001

3 Alternative Shipping Technologies

In this section, we investigate the implications of our model under alternative shipping technologies. To do so, we consider three alternative values of $\varphi = \{0.80, 0.40, 0.00\}$ and then re-estimate the model according to the approach discussed in Section 5 of the paper. The tables in the following subsections report the results. Tables 12-14 report the parameterizations of these economies. Table 15 reports the price and income elasticities implied by these economies.

3.1 Parameterization

Table 12: Shipping Technology – Predetermined Parameters

A. Predetermined Parameters

Parameter		*(1)*	*(2)*	*(3)*
Intertemporal elasticity of substitution	$1/\gamma$	0.50	0.50	0.50
Share of consumption in utility	μ	0.34	0.34	0.34
Share of capital in production	θ	0.36	0.36	0.36
Depreciation rate	δ	0.025	0.025	0.025
Share of imports that arrive today	φ	0.80	0.40	0.00

Table 13: Shipping Technology – Estimated Parameters

B. Estimated Parameters

Parameter		*(1)*	*(2)*	*(3)*
Elasticity of substitution	σ	1.163	1.342	1.428
Capital adjustment cost	η_k	0.655	1.543	1.017
Bond adjustment cost	η_b	1.273	0.597	0.428
Trade cost	τ	2341.361	39.304	18.293
Discount factor	β	0.978	0.979	0.980
Surplus consumption autocorrelation	ρ_s	0.835	0.702	0.694
S.S. surplus consumption	$\bar{s}$	0.00126	0.00048	0.00039
Moment	*Data*	*(1)*	*(2)*	*(3)*
Empirical Price Elasticity	-0.315	-0.324	-0.320	-0.320
Std. Dev. Investment / Std. Dev. GDP	3.119	3.101	3.134	3.121
Std. Dev. NX/GDP	1.113	1.106	1.116	1.114
Imports / Absorption	0.219	0.219	0.220	0.220
Avg. Realized SDF	0.988	1.000	0.999	1.007
Std. Dev. Realized SDF	0.220	0.229	0.218	0.220
corr(Realized SDF, Absorption)	0.102	0.106	0.101	0.102

Table 14: Shipping Technology – Estimated Parameters

C. Estimated Parameters, Stochastic Process for $\{z, p_y, p_x\}$

Parameter	*(1)*	*(2)*	*(3)*	*Moment*	*Data*	*(1)*	*(2)*	*(3)*
$\rho_{z,z}$	0.639	0.645	0.536	$\text{corr}(A_t, A_{t-1})$	0.881	0.980	0.975	0.948
ρ_{z,p_y}	-0.509	-0.318	-0.337	$\text{corr}(A_t, p_{y,t-1})$	-0.282	-0.291	-0.282	-0.283
ρ_{z,p_x}	-0.720	-0.767	-0.805	$\text{corr}(A_t, p_{A,t-1})$	-0.603	-0.599	-0.599	-0.584
$\rho_{p_y,z}$	0.158	0.314	0.309	$\text{corr}(p_{y,t}, A_{t-1})$	-0.002	-0.002	-0.002	-0.002
ρ_{p_y,p_y}	0.999	0.980	0.969	$\text{corr}(p_{y,t}, p_{y,t-1})$	0.910	0.949	0.966	0.956
ρ_{p_y,p_x}	-0.098	0.003	0.000	$\text{corr}(p_{y,t}, p_{A,t-1})$	0.224	0.220	0.227	0.227
$\rho_{p_x,z}$	-0.033	-0.021	-0.010	$\text{corr}(p_{A,t}, A_{t-1})$	-0.520	-0.532	-0.526	-0.526
ρ_{p_x,p_y}	0.114	0.068	0.068	$\text{corr}(p_{A,t}, p_{y,t-1})$	0.629	0.682	0.610	0.596
ρ_{p_x,p_x}	0.892	0.999	0.993	$\text{corr}(p_{A,t}, p_{A,t-1})$	0.904	0.957	0.926	0.885
Std. dev. ν_z	0.0023	0.0049	0.0126	Std. dev. (A_t)	0.025	0.025	0.025	0.024
Std. dev. ν_y	0.0032	0.0043	0.0048	Std. dev. $(p_{y,t})$	0.032	0.018	0.033	0.032
Std. dev. ν_x	0.0009	0.0032	0.0044	Std. dev. $(p_{A,t})$	0.009	0.008	0.009	0.009
$\text{corr}(\nu_z, \nu_{p_y})$	0.0266	0.0372	0.0206	$\text{corr}(A_t, p_{y,t})$	-0.154	-0.159	-0.150	-0.155
$\text{corr}(\nu_z, \nu_{p_x})$	-0.9995	-0.9978	-0.9995	$\text{corr}(A_t, p_{A,t})$	-0.609	-0.588	-0.597	-0.621
$\text{corr}(\nu_{p_y}, \nu_{p_x})$	-0.00002	0.0284	-0.0386	$\text{corr}(p_{y,t}, p_{A,t})$	0.442	0.474	0.441	0.448

3.2 Results

Table 15: Shipping Technology – Import Elasticities

	Price Elasticity	*Income Elasticity*
Data	-0.315	1.602
Baseline	-0.326	1.243
(1) $\varphi = 0.8$	-0.324	1.067
(2) $\varphi = 0.4$	-0.320	1.319
(3) $\varphi = 0.0$	-0.320	1.402

4 Alternative Payment Technologies

In this section, we investigate the implications of our model under alternative payment technologies. To do so, we first extend the model to feature a richer set of payment technologies. In particular, we consider an extension of the model that allows for a fraction ψ of imports ordered in a given period to be paid in the same period; in the baseline model, we assume that $\psi = 1$.

Then, we consider three alternative parameterizations of the payment technologies. The first two re-estimate the model following the approach discussed in Section 5 of the paper under $\psi = \{0.80, 0.40\}$, while keeping the shipping technology at its baseline value ($\varphi = 0.63$). The last parameterization considers an alternative combination of ψ and φ that implies the same share of cash-in-advance transactions as featured by our baseline model (37%); in particular, we re-estimate the model under $\varphi = 0.40$ and $\psi = 0.62$[2].

The tables in the following subsections report the results. Tables 16-18 report the parameterizations of these economies. Table 19 reports the price and income elasticities implied by these economies.

4.1 Model with Alternative Payment Technologies

We extend the model such that a fraction ψ of the imports ordered in period t are paid in period t, while the remaining share $1-\psi$ of the imports ordered in t are paid in period $t+1$. We adjust the problem of final good producers (the importers) accordingly:

$$\max_{\{x_t, y_{t+1}\}_{t=0}^{\infty}} \mathbb{E}_0 \left\{ \sum_{t=0}^{\infty} \left[\beta^t \lambda_t\right] \left[p_t G(x_t, \widetilde{y}_t) - p_{x,t} x_t - (1-\psi)\tau p_{y,t-1} y_t - \psi \tau p_{y,t} y_{t+1}\right] \right\}$$

subject to

$$G(x_t, \widetilde{y}_t) = \left[x_t^{\rho} + \widetilde{y}_t^{\rho}\right]^{\frac{1}{\rho}}$$

$$\widetilde{y}_t = (1-\varphi) y_t + \varphi y_{t+1}$$

We also assume that domestic good producers (the exporters) are paid by importers in the rest of the world according to this technology. To do so, we assume that domestic good producers take as given the equilibrium share of their production that is exported in every period and state of the world, and get paid a fraction ψ of their period-t exports in the same period, and a fraction $1-\psi$ of them in the following period. Then, the problem of domestic good producers is given by:

$$\max_{k_{d,t}, n_{d,t}} \left\{ \frac{x_t}{x_t + \tau x_{t+1}^*} + \frac{\psi \tau x_{t+1}^*}{x_t + \tau x_{t+1}^*} \right\} p_{x,t} z_t k_{d,t}^{\theta} n_{d,t}^{1-\theta} - p_t w_t n_{d,t} - p_t r_{k,t} k_{d,t} + \beta \mathbb{E}_0 \left[\frac{\lambda_{t+1}}{\lambda_t} \left(\frac{(1-\psi)\tau x_{t+1}^*}{x_t + \tau x_{t+1}^*} \right) \right] p_{x,t} z_t k_{d,t}^{\theta} n_{d,t}^{1-\theta}$$

[2] Note that $(1 - 0.40) \times 0.62 = 0.37$; see Section 5 of the paper for more details.

4.2 Parameterization

Table 16: Payment Technology – Predetermined Parameters

A. Predetermined Parameters

Parameter		*(1)*	*(2)*	*(3)*
Intertemporal elasticity of substitution	$1/\gamma$	0.50	0.50	0.50
Share of consumption in utility	μ	0.34	0.34	0.34
Share of capital in production	θ	0.36	0.36	0.36
Depreciation rate	δ	0.025	0.025	0.025
Share of imports that arrive today	φ	***0.63***	***0.63***	***0.40***
Share of imports paid today	ψ	***0.80***	***0.40***	***0.62***

Table 17: Payment Technology – Estimated Parameters

B. Estimated Parameters

Parameter		*(1)*	*(2)*	*(3)*
Elasticity of substitution	σ	1.174	1.241	1.212
Capital adjustment cost	η_k	0.806	1.000	1.584
Bond adjustment cost	η_b	1.298	3.592	1.628
Trade cost	τ	1429.059	191.508	368.812
Discount factor	β	0.978	0.990	0.977
Surplus consumption autocorrelation	ρ_s	0.918	1.000	0.500
S.S. surplus consumption	$\bar{s}$	0.00239	0.00201	0.00034
Moment	*Data*	*(1)*	*(2)*	*(3)*
Empirical Price Elasticity	-0.315	-0.324	-0.325	-0.322
Std. Dev. Investment / Std. Dev. GDP	3.119	3.097	3.065	3.100
Std. Dev. NX/GDP	1.113	1.099	0.836	1.105
Imports / Absorption	0.219	0.220	0.220	0.221
Avg. Realized SDF	0.988	1.001	1.010	1.003
Std. Dev. Realized SDF	0.220	0.231	0.228	0.225
corr(Realized SDF, Absorption)	0.102	0.107	0.106	0.105

Table 18: Payment Technology – Estimated Parameters

C. Estimated Parameters, Stochastic Process for $\{z, p_y, p_x\}$

Parameter	*(1)*	*(2)*	*(3)*	*Moment*	*Data*	*(1)*	*(2)*	*(3)*
$\rho_{z,z}$	0.685	0.703	0.567	$\text{corr}(A_t, A_{t-1})$	0.881	0.980	0.970	0.980
ρ_{z,p_y}	-0.537	-0.351	-0.377	$\text{corr}(A_t, p_{y,t-1})$	-0.282	-0.281	-0.348	-0.294
ρ_{z,p_x}	-0.646	-0.447	-0.948	$\text{corr}(A_t, p_{A,t-1})$	-0.603	-0.609	-0.560	-0.579
$\rho_{p_y,z}$	0.166	0.077	0.282	$\text{corr}(p_{y,t}, A_{t-1})$	-0.002	-0.002	-0.002	-0.002
ρ_{p_y,p_y}	1.000	0.998	0.984	$\text{corr}(p_{y,t}, p_{y,t-1})$	0.910	0.949	0.963	0.967
ρ_{p_y,p_x}	-0.001	0.000	0.002	$\text{corr}(p_{y,t}, p_{A,t-1})$	0.224	0.223	0.306	0.215
$\rho_{p_x,z}$	-0.043	-0.383	-0.035	$\text{corr}(p_{A,t}, A_{t-1})$	-0.520	-0.541	-0.313	-0.513
ρ_{p_x,p_y}	0.119	0.665	0.089	$\text{corr}(p_{A,t}, p_{y,t-1})$	0.629	0.675	0.431	0.648
ρ_{p_x,p_x}	0.85496	-0.13952	0.98084	$\text{corr}(p_{A,t}, p_{A,t-1})$	0.904	0.955	0.135	0.964
Std. dev. ν_z	0.0022	0.0005	0.0046	Std. dev. (A_t)	0.025	0.025	0.018	0.024
Std. dev. ν_y	0.0034	0.0020	0.0016	Std. dev. $(p_{y,t})$	0.032	0.016	0.008	0.028
Std. dev. ν_x	0.0011	0.0184	0.0009	Std. dev. $(p_{A,t})$	0.009	0.008	0.017	0.009
$\text{corr}(\nu_z, \nu_{p_y})$	0.0000	0.0000	-0.917	$\text{corr}(A_t, p_{y,t})$	-0.154	-0.153	-0.182	-0.155
$\text{corr}(\nu_z, \nu_{p_x})$	-0.9982	-0.9980	0.7395	$\text{corr}(A_t, p_{A,t})$	-0.609	-0.598	-0.450	-0.561
$\text{corr}(\nu_{p_y}, \nu_{p_x})$	0.0505	0.0631	-0.6677	$\text{corr}(p_{y,t}, p_{A,t})$	0.442	0.473	0.378	0.447

4.3 Results

Table 19: Payment Technology – Import Elasticities

	Price Elasticity	*Income Elasticity*
Data	-0.315	1.602
Baseline	-0.326	1.243
(1) $\psi = 0.80$	-0.324	1.031
(2) $\psi = 0.40$	-0.325	0.584
(3) $\psi = 0.62$, $\varphi = 0.40$	-0.322	1.113

5 Sensitivity Analysis

5.1 International Financial Autarky

In this subsection, we investigate the implications of our model under international financial autarky. To do so, we re-estimate the model according to the approach discussed in Section 5 of the paper. Also, given financial autarky, we set $\eta_b = \infty$ and remove the standard deviation of the net exports to GDP ratio from the set of target moments The tables in the following subsections report the results. Tables 20-22 report the parameterizations of these economies. Table 23 reports the price and income elasticities implied by these economies.

Table 20: International Financial Autarky – Predetermined Parameters

A. Predetermined Parameters

Parameter		*Autarky*
Intertemporal elasticity of substitution	$1/\gamma$	0.50
Share of consumption in utility	μ	0.34
Share of capital in production	θ	0.36
Depreciation rate	δ	0.025
Share of imports that arrive today	φ	0.63

Note: σ is predetermined at its baseline value (1.32).

Table 21: International Financial Autarky – Estimated Parameters

B. Estimated Parameters

Parameter		*Autarky*
Elasticity of substitution	σ	1.297
Capital adjustment cost	η_k	2.099
Bond adjustment cost	η_b	∞
Trade cost	τ	70.704
Discount factor	β	0.990
Surplus consumption autocorrelation	ρ_s	0.664
S.S. surplus consumption	$\bar{s}$	0.00015
Moment	*Data*	*Autarky*
Empirical Price Elasticity	-0.315	-0.317
Std. Dev. Investment / Std. Dev. GDP	3.119	3.363
Std. Dev. NX/GDP	1.113	0.144
Imports / Absorption	0.219	0.219
Avg. Realized SDF	0.988	1.009
Std. Dev. Realized SDF	0.220	0.223
corr(Realized SDF, Absorption)	0.102	0.101

Table 22: International Financial Autarky – Estimated Parameters

C. Estimated Parameters, Stochastic Process for $\{z, p_y, p_x\}$

Parameter	*Autarky*	*Moment*	*Data*	*Autarky*
$\rho_{z,z}$	0.586	$\text{corr}(A_t, A_{t-1})$	0.881	0.985
ρ_{z,p_y}	-0.239	$\text{corr}(A_t, p_{y,t-1})$	-0.282	-0.226
ρ_{z,p_x}	-0.804	$\text{corr}(A_t, p_{A,t-1})$	-0.603	-0.707
$\rho_{p_y,z}$	0.240	$\text{corr}(p_{y,t}, A_{t-1})$	-0.002	-0.002
ρ_{p_y,p_y}	0.961	$\text{corr}(p_{y,t}, p_{y,t-1})$	0.910	0.969
ρ_{p_y,p_x}	0.018	$\text{corr}(p_{y,t}, p_{A,t-1})$	0.224	0.186
$\rho_{p_x,z}$	-0.003	$\text{corr}(p_{A,t}, A_{t-1})$	-0.520	-0.600
ρ_{p_x,p_y}	0.044	$\text{corr}(p_{A,t}, p_{y,t-1})$	0.629	0.416
ρ_{p_x,p_x}	0.99902	$\text{corr}(p_{A,t}, p_{A,t-1})$	0.904	0.934
Std. dev. ν_z	0.0000	Std. dev. (A_t)	0.025	0.016
Std. dev. ν_y	0.0044	Std. dev. $(p_{y,t})$	0.032	0.018
Std. dev. ν_x	0.0021	Std. dev. $(p_{A,t})$	0.009	0.006
$\text{corr}(\nu_z, \nu_{p_y})$	0.0511	$\text{corr}(A_t, p_{y,t})$	-0.154	-0.122
$\text{corr}(\nu_z, \nu_{p_x})$	-0.9925	$\text{corr}(A_t, p_{A,t})$	-0.609	-0.669
$\text{corr}(\nu_{p_y}, \nu_{p_x})$	0.0717	$\text{corr}(p_{y,t}, p_{A,t})$	0.442	0.323

Table 23: International Financial Autarky – Import Elasticities

	Price Elasticity	*Income Elasticity*
Data	-0.315	1.602
Baseline	-0.326	1.243
International Financial Autarky	-0.317	1.226

5.2 Target Real Interest Rate Moments

In this subsection, we investigate the implications of our model when estimated to match salient features of the real interest rate instead of the SDF. To do so, we re-estimate the model according to the approach discussed in Section 5 of the paper. We measure the real interest rate as the quarterly inflation adjusted rate on the 90-day Treasury bill over the period Q2 1967 to Q3 2013. We adjust for inflation using the consumption price index for all urban consumers (all items less food and energy). The tables in the following subsections report the results. Tables 24-26 report the parameterizations of these economies. Table 27 reports the price and income elasticities implied by these economies.

Table 24: Target Real Interest Rate – Predetermined Parameters

A. Predetermined Parameters

Parameter		*Target Real Interest Rate*
Intertemporal elasticity of substitution	$1/\gamma$	0.50
Share of consumption in utility	μ	0.34
Share of capital in production	θ	0.36
Depreciation rate	δ	0.025
Share of imports that arrive today	φ	0.63

Table 25: Target Real Interest Rate – Estimated Parameters

B. Estimated Parameters

Parameter		*Target Real Interest Rate*
Elasticity of substitution	σ	1.302
Capital adjustment cost	η_k	1.741
Bond adjustment cost	η_b	3.708
Trade cost	τ	67.237
Discount factor	β	0.997
Surplus consumption autocorrelation	ρ_s	0.512
S.S. surplus consumption	$\bar{s}$	0.00011
Moment	*Data*	*Target Real Interest Rate*
Empirical price elasticity	-0.315	-0.315
Std. Dev. Investment / Std. Dev. GDP	3.119	2.852
Std. Dev. NX/GDP	1.113	1.032
Imports / Absorption	0.219	0.220
Avg. Realized R (%)	0.270	0.280
Std. Dev. Realized R (%)	0.580	0.598
corr(Realized R, Absorption)	0.046	0.046

Table 26: Target Real Interest Rate – Estimated Parameters

C. Estimated Parameters, Stochastic Process for $\{z, p_y, p_x\}$

Parameter	*Target Real Interest Rate*	*Moment*	*Data*	*Target Real Interest Rate*
$\rho_{z,z}$	0.670	$\text{corr}(A_t, A_{t-1})$	0.881	0.970
ρ_{z,p_y}	-0.297	$\text{corr}(A_t, p_{y,t-1})$	-0.282	-0.269
ρ_{z,p_x}	-0.997	$\text{corr}(A_t, p_{A,t-1})$	-0.603	-0.699
$\rho_{p_y,z}$	0.242	$\text{corr}(p_{y,t}, A_{t-1})$	-0.002	-0.002
ρ_{p_y,p_y}	0.962	$\text{corr}(p_{y,t}, p_{y,t-1})$	0.910	0.971
ρ_{p_y,p_x}	0.045	$\text{corr}(p_{y,t}, p_{A,t-1})$	0.224	0.244
$\rho_{p_x,z}$	-0.025	$\text{corr}(p_{A,t}, A_{t-1})$	-0.520	-0.536
ρ_{p_x,p_y}	0.022	$\text{corr}(p_{A,t}, p_{y,t-1})$	0.629	0.443
ρ_{p_x,p_x}	0.94885	$\text{corr}(p_{A,t}, p_{A,t-1})$	0.904	0.915
Std. dev. ν_z	0.0048	Std. dev. (A_t)	0.025	0.032
Std. dev. ν_y	0.0093	Std. dev. $(p_{y,t})$	0.032	0.043
Std. dev. ν_x	0.0043	Std. dev. $(p_{A,t})$	0.009	0.010
$\text{corr}(\nu_z, \nu_{p_y})$	0.4940	$\text{corr}(A_t, p_{y,t})$	-0.154	-0.144
$\text{corr}(\nu_z, \nu_{p_x})$	0.5108	$\text{corr}(A_t, p_{A,t})$	-0.609	-0.636
$\text{corr}(\nu_{p_y}, \nu_{p_x})$	-0.0155	$\text{corr}(p_{y,t}, p_{A,t})$	0.442	0.367

Table 27: Target Real Interest Rate – Import Elasticities

	Price Elasticity	*Income Elasticity*
Data	-0.315	1.602
Baseline	-0.326	1.243
Target Real Interest Rate	-0.315	1.334

5.3 HP-Filtering

In this subsection, we investigate the implications of our model when HP-filtering the simulated data. First, we examine the implied income and price elasticities of the baseline parameterization of the time-to-ship and static models with and without HP-filtering the simulated data; see Table 28 for these results.

Then, we re-estimate the model such that the moments implied after HP-filtering the simulated data are as close as possible to those observed in the data. To do so, we follow the approach discussed in Section 5 of the paper. The tables in the following subsections report the results. Tables 29-31 report the parameterizations of these economies. Table 32 reports the price and income elasticities implied by these economies.

5.3.1 Baseline Parameterization

Table 28: HP-Filtering – Import Elasticities

	Price Elasticity	*Income Elasticity*
Data	-0.315	1.602
Time-to-Ship Model	-0.326	1.243
No Time-to-Ship	-1.297	1.000
Time-to-Ship Model, HP-filtering simulated data	-0.317	1.443
No Time-to-Ship, HP-filtering simulated data	-1.297	1.000

5.3.2 Re-Estimated Model

Table 29: HP-Filtering – Predetermined Parameters

A. Predetermined Parameters

Parameter		*HP-filter*
Intertemporal elasticity of substitution	$1/\gamma$	0.50
Share of consumption in utility	μ	0.34
Share of capital in production	θ	0.36
Depreciation rate	δ	0.025
Share of imports that arrive today	φ	0.63

Table 30: HP-Filtering – Estimated Parameters

B. Estimated Parameters

Parameter		*HP-filter*
Elasticity of substitution	σ	1.214
Capital adjustment cost	η_k	1.801
Bond adjustment cost	η_b	1.632
Trade cost	τ	364.649
Discount factor	β	0.979
Surplus consumption autocorrelation	ρ_s	1.000
S.S. surplus consumption	$\bar{s}$	0.01458
Moment	*Data*	*HP-filter*
Empirical Price Elasticity	-0.315	-0.321
Std. Dev. Investment / Std. Dev. GDP	3.119	3.109
Std. Dev. NX/GDP	1.113	1.101
Imports / Absorption	0.219	0.220
Avg. Realized SDF	0.988	1.004
Std. Dev. Realized SDF	0.220	0.228
corr(Realized SDF, Absorption)	0.102	0.104

Table 31: HP-Filtering – Estimated Parameters

C. Estimated Parameters, Stochastic Process for $\{z, p_y, p_x\}$

Parameter	*HP-filter*	*Moment*	*Data*	*HP-filter*
$\rho_{z,z}$	0.898	$\text{corr}(A_t, A_{t-1})$	0.881	0.965
ρ_{z,p_y}	-0.209	$\text{corr}(A_t, p_{y,t-1})$	-0.282	-0.347
ρ_{z,p_x}	-0.283	$\text{corr}(A_t, p_{A,t-1})$	-0.603	-0.646
$\rho_{p_y,z}$	0.215	$\text{corr}(p_{y,t}, A_{t-1})$	-0.002	-0.002
ρ_{p_y,p_y}	0.986	$\text{corr}(p_{y,t}, p_{y,t-1})$	0.910	0.978
ρ_{p_y,p_x}	-0.051	$\text{corr}(p_{y,t}, p_{A,t-1})$	0.224	0.252
$\rho_{p_x,z}$	-0.035	$\text{corr}(p_{A,t}, A_{t-1})$	-0.520	-0.507
ρ_{p_x,p_y}	0.028	$\text{corr}(p_{A,t}, p_{y,t-1})$	0.629	0.479
ρ_{p_x,p_x}	0.99991	$\text{corr}(p_{A,t}, p_{A,t-1})$	0.904	0.820
Std. dev. ν_z	0.0000	Std. dev. (A_t)	0.025	0.020
Std. dev. ν_y	0.0000	Std. dev. $(p_{y,t})$	0.032	0.033
Std. dev. ν_x	0.0067	Std. dev. $(p_{A,t})$	0.009	0.009
$\text{corr}(\nu_z, \nu_{p_y})$	0.3275	$\text{corr}(A_t, p_{y,t})$	-0.154	-0.177
$\text{corr}(\nu_z, \nu_{p_x})$	-0.7581	$\text{corr}(A_t, p_{A,t})$	-0.609	-0.606
$\text{corr}(\nu_{p_y}, \nu_{p_x})$	0.3703	$\text{corr}(p_{y,t}, p_{A,t})$	0.442	0.378

Table 32: HP-Filtering – Import Elasticities

	Price Elasticity	*Income Elasticity*
Data	-0.315	1.602
Baseline	-0.326	1.243
HP-filter	-0.321	1.254

6 Two-Country Model

In this section, we investigate the implications of a two-country version of our model. We begin by describing the economic environment. Then, we consider two alternative parameterizations. First, we consider a two-country model with the same parametrization as our baseline model (see Table 3 of the paper); that is, we use the same values as in the paper to parametrize the habits process, the trade cost, the capital adjustment cost, and the bond-holding cost. Second, we consider a two-country model in which these parameters are estimated to match the SDF moments, the imports-to-absorption share, and the relative volatility of investment and net exports. In both economies, we parameterize the stochastic productivity process as in Backus et al. (1994) and keep the elasticity of substitution σ at its baseline value (1.32).

The tables in the following subsections report the results. Tables 33 and 34 report the parameterizations of these economies. Table 35 reports the implied dynamics of absorption and prices. Table 36 reports the price and income elasticities implied by these economies. Table 37 reports additional business cycle implications of these economies.

6.1 Setup

- Two countries: home, foreign
- Four goods:
  - Produced by home: good x, home final good
  - Produce by foreign: good y, foreign final good
  - Only goods x and y can be traded internationally
- Agents in the home country:
  - Representative household (unit measure)
  - Representative producer of good x (unit measure)
  - Representative home final good producer (unit measure)
- Agents in the foreign country:
  - Representative household (unit measure)
  - Representative producer of good y (unit measure)
  - Representative foreign final good producer (unit measure)
- Home final good is the numeraire: $p_t = 1$
- International financial markets:
  - One-period risk-free bond denominated in units of good x at interest rate r_t

6.1.1 Home country

Household

$$\max_{\{c_t,n_t,i_t,k_{t+1},b_{t+1}\}_{t=0}^{\infty}} \mathbb{E}_0 \left\{ \sum_{t=0}^{\infty} \beta^t \frac{\left[(c_t - h_t)^{\mu}(1-n_t)^{1-\mu}\right]^{1-\gamma}}{1-\gamma} \right\}$$

subject to

$$p_t c_t + p_t i_t + \frac{p_{x,t} b_{t+1}}{1+r_t} + p_t \frac{\eta_b}{2} \left(b_{t+1}\right)^2 + p_t \frac{\eta_k}{2} \left(k_{t+1} - k_t\right)^2 = p_t w_t n_t + p_t r_{k,t} k_t + p_{x,t} b_t + \Pi_t$$

$$k_{t+1} = (1-\delta)k_t + i_t$$

$$g_t = \frac{c_t - h_t}{c_t}$$

$$\log g_t = (1-\rho_g)\log \bar{g} + \rho_g \log g_{t-1} + \varphi_t \log\left(\frac{c_t}{c_{t-1}}\right)$$

$$\varphi_t = \frac{1}{\bar{g}} \sqrt{1 - 2(\log g_t - \log \bar{g})} - 1$$

Producer of good x

$$\max_{k_{d,t},n_{d,t}} p_{x,t} z_t k_{d,t}^{\theta} n_{d,t}^{1-\theta} - p_t w_t n_{d,t} - p_t r_{k,t} k_{d,t}$$

Final good producer

$$\max_{\{x_t,y_{t+1}\}_{t=0}^{\infty}} \mathbb{E}_0 \left\{ \sum_{t=0}^{\infty} \left[\beta^t \lambda_t\right] \left[p_t G(x_t, \widetilde{y}_t) - p_{x,t} x_t - \tau p_{y,t} y_{t+1}\right] \right\}$$

subject to

$$G(x_t, \widetilde{y}_t) = \left[x_t^{\rho} + \widetilde{y}_t^{\rho}\right]^{\frac{1}{\rho}}$$

$$\widetilde{y}_t = (1-\phi)y_t + \phi y_{t+1}$$

where:

- λ_t is the Lagrange multiplier on the period-t budget constraint of the household
- Period-t profits Π_t are given by $p_t G(x_t, \widetilde{y}_t) - p_{x,t} x_t - \tau p_{y,t} y_{t+1}$

6.1.2 Foreign country

Household

$$\max_{\{c_t^*, n_t^*, i_t^*, k_{t+1}^*, b_{t+1}^*\}_{t=0}^{\infty}} \mathbb{E}_0 \left\{ \sum_{t=0}^{\infty} \beta^t \frac{\left[(c_t^* - h_t^*)^{\mu}(1-n_t^*)^{1-\mu}\right]^{1-\gamma}}{1-\gamma} \right\}$$

subject to

$$p_t^* c_t^* + p_t^* i_t^* + \frac{p_{x,t} b_{t+1}^*}{1+r_t^*} + p_t \frac{\eta_b}{2}\left(b_{t+1}^*\right)^2 + p_t \frac{\eta_k}{2}\left(k_{t+1}^* - k_t^*\right)^2 = p_t^* w_t^* n_t^* + p_t^* r_{k,t}^* k_t^* + p_{x,t} b_t^* + \Pi_t^*$$

$$k_{t+1}^* = (1-\delta)k_t^* + i_t^*$$

$$g_t^* = \frac{c_t^* - h_t^*}{c_t^*}$$

$$\log g_t^* = (1-\rho_g)\log \bar{g} + \rho_g \log g_{t-1}^* + \varphi_t^* \log\left(\frac{c_t^*}{c_{t-1}^*}\right)$$

$$\varphi_t^* = \frac{1}{\bar{g}}\sqrt{1 - 2(\log g_t^* - \log \bar{g})} - 1$$

Producer of good y

$$\max_{k_{d,t}^*, n_{d,t}^*} p_{y,t} z_t^* {k_{d,t}^*}^{\theta} {n_{d,t}^*}^{1-\theta} - p_t^* w_t^* n_{d,t}^* - p_t^* r_{k,t}^* k_{d,t}^*$$

Final good producer

$$\max_{\{x_{t+1}^*, y_t^*\}_{t=0}^{\infty}} \mathbb{E}_0 \left\{ \sum_{t=0}^{\infty} \left[\beta^t \lambda_t^*\right] \left[p_t^* G(\widetilde{x_t}^*, y_t^*) - \tau p_{x,t} x_{t+1}^* - p_{y,t} y_t^*\right] \right\}$$

subject to

$$G(\widetilde{x_t}^*, y_t^*) = \left[\widetilde{x_t^*}^{\rho} + {y_t^*}^{\rho}\right]^{\frac{1}{\rho}}$$

$$\widetilde{x_t}^* = (1-\phi)x_t^* + \phi x_{t+1}^*$$

where:

- λ_t^* is the Lagrange multiplier on the period-t budget constraint of the household
- Period-t profits Π_t are given by $p_t^* G(\widetilde{x_t}^*, y_t^*) - \tau p_{x,t} x_{t+1}^* - p_{y,t} y_t^*$

6.1.3 Stochastic processes

$$z_{t+1} = (1-\rho_z) + \rho_z z_t + \rho_{z,z_*} z_t^* + \varepsilon_{z,t+1}$$

$$z_{t+1}^* = (1-\rho_z) + \rho_z z_t^* + \rho_{z,z_*} z_t + \varepsilon_{z^*,t+1}$$

where $V(\varepsilon_z) = V(\varepsilon_{z^*}) = \sigma_z^2$ and $corr(\varepsilon_z, \varepsilon_{z^*}) = \sigma_{z,z^*}$.

6.1.4 Market clearing conditions

Capital

$$k_{t+1} = k_{d,t+1}$$
$$k^*_{t+1} = k^*_{d,t+1}$$

Labor

$$n_t = n_{d,t}$$
$$n^*_t = n^*_{d,t}$$

Intermediate goods

$$x_t + \tau x^*_{t+1} = z_t k_t^{\theta} n_{d,t}^{1-\theta}$$
$$\tau y_{t+1} + y^*_t = z^*_t k_t^{*\theta} {n^*_{d,t}}^{1-\theta}$$

Final goods

$$G(x_t, \widetilde{y}_t) = c_t + i_t + \Phi^b(b_{t+1}) + \Phi^k(k_{t+1}, k_t)$$
$$G(\widetilde{x_t}^*, y^*_t) = c^*_t + i^*_t + \Phi^b(b^*_{t+1}) + \Phi^k(k^*_{t+1}, k^*_t)$$

Financial markets

$$b_{t+1} + b^*_{t+1} = 0$$
$$r_t = r^*_t$$

6.2 Parameterization

Table 33: Two Country Model – Predetermined Parameters

A. Predetermined Parameters

Parameter		*Baseline*	*2 countries (parameters from baseline)*	*2 countries (estimated parameters)*
Intertemporal elasticity of substitution	$1/\gamma$	0.50	0.50	0.50
Share of consumption in utility	μ	0.34	0.34	0.34
Share of capital in production	θ	0.36	0.36	0.36
Depreciation rate	δ	0.025	0.025	0.025
Elasticity of substitution	σ	1.297	1.297	1.297
Share of imports that arrive today	φ	0.63	0.63	0.63
Productivity persistence		–	0.906	0.906
Productivity spillover across countries		–	0.088	0.088
Std. deviation of productivity		–	0.00852	0.00852
Correlation between home and foreign shocks		–	0.258	0.258

Note: σ is predetermined at its baseline value (1.32).

Table 34: Two Country Model – Estimated Parameters

B. Estimated Parameters

Parameter		*Baseline*	*2-countries (parameters from baseline)*	*2-countries (estimated parameters)*
Capital adjustment cost	η_k	1.961	1.961	0.000
Bond adjustment cost	η_b	0.846	0.846	0.000
Trade cost	τ	69.235	69.235	56.224
Discount factor	β	0.976	0.976	1.000
Surplus consumption autocorrelation	ρ_s	0.618	0.618	0.720
S.S. surplus consumption	$\bar{s}$	0.00048	0.00048	0.00113
Moment	*Data*	*Baseline*	*2-countries (parameters from baseline)*	*2-countries (estimated parameters)*
Std. Dev. Investment / Std. Dev. GDP	3.119	3.084	5.091	3.449
Std. Dev. NX/GDP	1.113	1.106	0.233	0.634
Imports / Absorption	0.219	0.220	0.423	0.220
Avg. Realized SDF	0.988	0.998	1.82×10^{88}	1.027
Std. Dev. Realized SDF	0.220	0.223	2.49×10^{89}	0.222
corr(Realized SDF, Absorption)	0.102	0.108	-0.084	0.096

Table 35: Two Country Model – Absorption and Price Dynamics

Moment	*Data*	*Baseline*	*2-countries (parameters from baseline)*	*2-countries (estimated parameters)*
$\text{corr}(A_t, A_{t-1})$	0.881	0.980	0.790	0.412
$\text{corr}(A_t, p_{y,t-1})$	-0.282	-0.302	0.052	0.023
$\text{corr}(A_t, p_{A,t-1})$	-0.603	-0.607	0.053	-0.035
$\text{corr}(p_{y,t}, A_{t-1})$	-0.002	-0.002	-0.022	0.439
$\text{corr}(p_{y,t}, p_{y,t-1})$	0.910	0.962	0.809	0.891
$\text{corr}(p_{y,t}, p_{A,t-1})$	0.224	0.224	0.665	-0.194
$\text{corr}(p_{A,t}, A_{t-1})$	-0.520	-0.535	0.066	0.252
$\text{corr}(p_{A,t}, p_{y,t-1})$	0.629	0.653	0.814	0.286
$\text{corr}(p_{A,t}, p_{A,t-1})$	0.904	0.954	0.777	-0.386
Std. dev. (A_t)	0.025	0.022	0.010	0.014
Std. dev. $(p_{y,t})$	0.032	0.029	0.009	0.003
Std. dev. $(p_{A,t})$	0.009	0.008	0.003	0.000
$\text{corr}(A_t, p_{y,t})$	-0.154	-0.160	-0.001	0.321
$\text{corr}(A_t, p_{A,t})$	-0.609	-0.595	0.001	-0.676
$\text{corr}(p_{y,t}, p_{A,t})$	0.442	0.459	0.889	-0.016

6.3 Results

Table 36: Two Country Model – Import Elasticities

	Price Elasticity	*Income Elasticity*
Data	-0.315	1.602
Baseline	-0.326	1.243
Time-to-Ship Model, 2 countries (parameters from baseline)	-1.091	1.110
Time-to-Ship Model, 2 countries (estimated parameters)	-1.259	0.956

Table 37: Two Country Model – Other Business Cycle Moments

	Data	*Baseline*	*2-countries (parameters from baseline)*	*2-countries (estimated parameters)*
σ(GDP)	2.090	3.064	1.190	1.069
σ(C)/σ(GDP)	0.990	0.306	0.217	0.012
corr(GDP$_t$,GDP$_{t-1}$)	0.830	0.976	0.694	0.690
corr(GDP$_t$,C$_t$)	0.760	0.544	-0.107	0.484
corr(GDP$_t$,I$_t$)	0.790	0.962	0.214	0.880
corr(GDP$_t$,NX$_t$)	-0.110	0.678	0.392	-0.279
σ(TOT)	1.850	3.322	1.123	0.342
corr(TOT$_t$,TOT$_{t-1}$)	0.790	0.964	0.790	0.874
corr(TOT$_t$,NX$_t$)	-0.150	-0.244	0.219	-0.202
corr(TOT$_t$,GDP$_t$)	0.002	0.165	0.523	0.417

7 Evidence on Time-to-Ship and Bilateral Import Volatility

In this section we report additional findings on the relationship between time-to-ship and bilateral import volatility. In particular, here we extend the findings reported in Section 8 of the paper to control for variables that are commonly used to account for bilateral trade flows. These results are reported in Table 38.

Table 38: Regression of Imports Volatility on Time-to-Ship

Dependent variable: Imports Volatility

	Without controls	With controls
Time-to-ship (log)	0.080***	0.102***
Distance (log)	—	-0.023*
Common language	—	0.011
GDP per capita (log)	—	0.004
R-squared	0.18	0.20
Observations	82	82

Note: Imports volatility measured as the standard deviation of the deviations of imports (log) around an HP-1600 trend. Three asterisks denote statistical significance at 1% level, while one asterisk denotes significance at 10% level.

References

Backus, D. K., Kehoe, P. J. & Kydland, F. E. (1994), 'Dynamics of the Trade Balance and the Terms of Trade: The J-Curve?', *American Economic Review* **84**(1), 84–103.