

A fresh assessment of the "euro effect" on US FDI

Mariam Camarero ¹ Sergi Moliner ² Cecilio Tamarit ³

¹Jaume I University and INTECO

²University of Valencia and INTECO

³University of Valencia and INTECO

Research Conference on the Single Market

7 February 2024

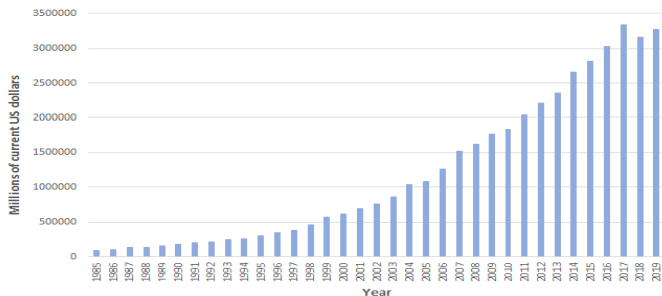
Brussels



Introduction and motivation

- In this paper, we analyze the determinants of US (United States) outward FDI (OFDI) stock, with a special focus in the effect of the EU and euro, for the period 1985-2019.

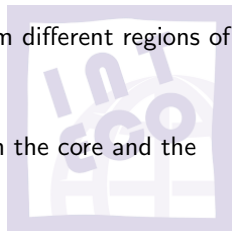
Figure: FDI outward stock from the United States in the EU



Source: Own elaboration. Data obtained from Bureau of Economic Analysis.

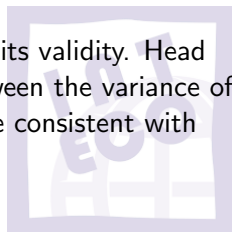
Introduction and motivation

- The elimination of trade and capital barriers associated with the creation of the Single Market has been a crucial factor in the increase of inward FDI.
- Furthermore, the parallel process of monetary integration has also been an important attractor for FDI.
- We include a dummy EU and use a variable that can take several values depending on the degree of monetary integration.
- To assess the effect of the EU and euro on US FDI:
 - We include a group composed by 56 countries from different regions of the world.
 - We also consider EU and EA countries separately.
 - Within this last group, we also distinguish between the core and the periphery.



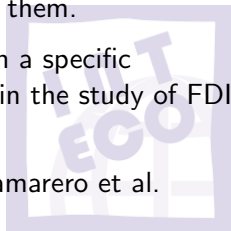
Introduction and motivation

- In addition, most researchers have applied the gravity equation approach to study the patterns of FDI through the Ordinary Least Squares (OLS) estimator.
- According to Santos Silva and Tenreyro (2006), the log-linear form could lead to misleading results in the presence of heteroskedasticity and zeros in the dependent variable.
- They propose the Pseudo Poisson Maximum Likelihood (PPML) estimator.
- However, some researchers remain skeptical about its validity. Head and Mayer (2014) states that the relationship between the variance of bilateral exports and its expected value may not be consistent with the assumptions of the PPML.

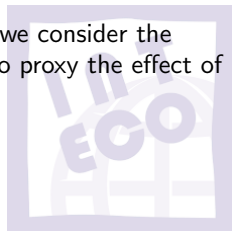


Introduction and motivation

- Kwon et al. (2022) propose a *Generalized* PPML (G-PPML) estimator, which relies on actual data to estimate the conditional variance of the dependent variable.
 - They apply the iterated General Method of Moments (iGMM) estimator to obtain the conditional variance of the dependent variable.
 - The G-PPML inherits all the desirable properties of the conventional PPML estimator.
 - It is more efficient for hypothesis testing.
 - It is robust to error term misspecification.
- In this paper, we use both estimators and compare them.
- Moreover, previous works have generally focused on a specific regression model and on an ad hoc gravity setting in the study of FDI patterns.
- We start with the variables considered robust in Camarero et al. (2021).



- Therefore, our contribution to the empirical literature is threefold.
 - We apply the PPML and G-PPML estimators.
 - Our baseline specification includes the variables considered robust in the Bayesian Modelling Averaging (BMA) analysis of Camarero et al. (2021).
 - Following Sondermann and Vansteenkiste (2019), we consider the whole process of monetary integration in Europe to proxy the effect of the euro.



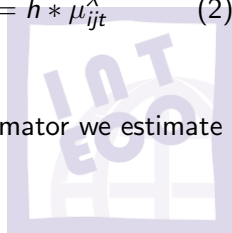
- We estimate our gravity equation using the PPML and G-PPML estimators. Therefore, we use the following empirical specification:

$$FDI_{ijt} = \exp[\gamma_1 X_{ijt} + \gamma_j + \gamma_t] + \epsilon_{ijt} \quad (1)$$

- Given a general form of the conditional variance:

$$Var(FDI_{ijt} | X_{ijt}, \gamma_j, \gamma_t) = Var(\epsilon_{ijt}, \gamma_j, \gamma_t) = h * \mu_{ijt}^\lambda \quad (2)$$

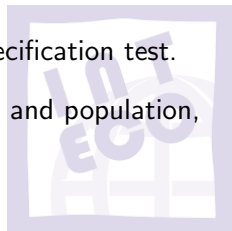
- PPML assumes that $\lambda = 1$. With the G-PPML estimator we estimate the true value of λ .



- Our selection of variables is based on those considered robust in the BMA analysis to explain FDI in Camarero et al. (2021).
- Our dependent variable is the US OFDI stock to the host country.
- The variable *Euro* distinguishes three levels of monetary integration in Europe: a value of 1 is given if the host country is outside the ERM but its currency is pegged to either the DMark/the ECU/or the Euro; 2 if its currency is pegged to the ECU or the euro via the ERM; 3 if its currency is the euro, and 0 otherwise.
- Camarero et al. (2021) interact this variable with other robust determinants related to the market size, labour endowments, trade openness and institutional quality of the host country.
- We also include a dummy *EU* in the whole and EU groups.

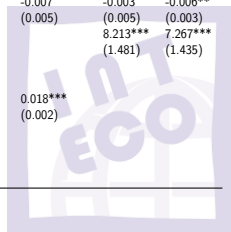


- There are two specifications by country-groups:
 - In the first specification, we assess the sole effect of the euro. We call this case "Benchmark model specification".
 - In the second specification, we study whether the euro has changed the patterns of US OFDI stock. We call this case "Augmented model specification".
- We include host country and year FE.
- Most of our estimated models pass the RESET specification test.
- I will focus on the main results, this is, market size and population, labour endowments, and trade openness results.



Benchmark model specification

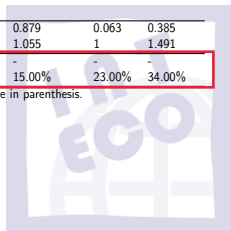
Variables	Whole group		EU countries		EA countries		EA core		EA periphery	
	PPMI	G.PPMI	PPMI	G.PPMI	PPMI	G.PPMI	PPMI	G.PPMI	PPMI	G.PPMI
EU	0.522*	0.531*	0.386	0.363						
	(0.277)	(0.276)	(0.358)	(0.298)						
Euro	0.040	0.028	-0.041	-0.036	0.353*	0.354*	0.139*	0.140**	0.207*	0.293***
	(0.126)	(0.117)	(0.094)	(0.080)	(0.190)	(0.208)	(0.073)	(0.068)	(0.111)	(0.090)
LogRealGDP	0.781**	0.821**	1.878*	2.037**	1.911***	1.829***	2.910***	2.900***	1.320***	1.258***
	(0.389)	(0.385)	(1.076)	(0.953)	(0.426)	(0.406)	(0.659)	(0.651)	(0.324)	(0.359)
UrbanPopulation					0.099***	0.103***	0.050***	0.050***	-0.044	-0.030
					(0.015)	(0.015)	(0.006)	(0.006)	(0.052)	(0.027)
LogRealGDPdiff	-0.935	-0.919								
	(0.610)	(0.623)								
LogSpatialLag	0.080	0.079	-0.303	-0.190			-0.469***	-0.465***		
	(0.071)	(0.061)	(0.202)	(0.158)			(0.093)	(0.088)		
OldDependencyRatio					0.019	0.015				
					(0.031)	(0.033)				
SkillLevel					-0.001	0.001	-0.007	-0.007	-0.003	-0.006**
					(0.010)	(0.010)	(0.005)	(0.005)	(0.005)	(0.003)
LogPopulationDensity	-0.080	-0.336	0.797	0.885	2.857	2.962			8.213***	7.267***
	(0.939)	(0.837)	(2.853)	(2.562)	(1.974)	(1.968)			(1.481)	(1.435)
TFP	0.006	0.005	-0.002	-0.003						
	(0.006)	(0.006)	(0.023)	(0.019)						
TradeOpenness	0.008***	0.009***					0.018***	0.018***		
	(0.002)	(0.002)					(0.002)	(0.002)		
RevenueTradeTaxes			0.053	0.041						
			(0.175)	(0.132)						
KOFSoGldf	-0.023**	-0.021**								
	(0.012)	(0.011)								



Empirical results

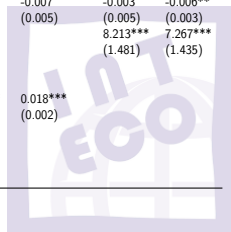
Variables	Whole group		EU countries		EA countries		EA core		EA periphery	
	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML
Chinn-ItoIndex	-0.001 (0.002)	-0.001 (0.002)								
DemoAccountability									0.003 (0.004)	-0.002 (0.004)
TopMarginal	-0.005 (0.006)	-0.002 (0.006)	-0.010 (0.010)	-0.007 (0.009)	-0.025*** (0.009)	-0.027*** (0.008)				
OwnershipBanks	-0.004* (0.003)	-0.003 (0.003)								
InflationCPI			0.002 (0.003)	-0.001 (0.003)						
Cellular	-0.003 (0.002)	-0.003 (0.002)					0.003 (0.003)	0.003 (0.003)		
Internet			-0.003 (0.008)	0.001 (0.008)						
NominalExchange					-0.009*** (0.003)	-0.008** (0.003)				
RESET test p-value	0.439	0.347	0.053	0.294	0.235	0.088	0.886	0.879	0.063	0.385
λ	1	1.178	1	1.183	1	0.891	1	1.055	1	1.491
EU	68.50%	70.10%	0.00%	0.00%	-	-	-	-	-	-
Euro	0.00%	0.00%	0.00%	0.00%	42.30%	42.50%	14.90%	15.00%	23.00%	34.00%

NOTES: ***, ** and * denote significance at levels 1%, 5% and 10%, respectively. Clustered standard errors are in parenthesis.



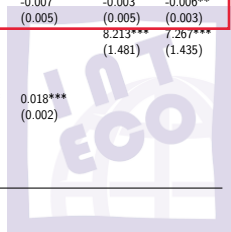
Benchmark model specification

Variables	Whole group		EU countries		EA countries		EA core		EA periphery	
	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML
EU	0.522* (0.277)	0.531* (0.276)	0.386 (0.358)	0.363 (0.298)						
Euro	0.040 (0.126)	0.028 (0.117)	-0.041 (0.094)	-0.036 (0.080)	0.353* (0.190)	0.354* (0.208)	0.139* (0.073)	0.140** (0.068)	0.207* (0.111)	0.293*** (0.090)
LogRealGDP	0.781** (0.389)	0.821** (0.385)	1.878* (1.076)	2.037** (0.953)	1.911*** (0.426)	1.829*** (0.406)	2.910*** (0.659)	2.900*** (0.651)	1.320*** (0.324)	1.258*** (0.359)
UrbanPopulation					0.099*** (0.015)	0.103*** (0.015)	0.050*** (0.006)	0.050*** (0.006)	-0.044 (0.052)	-0.030 (0.027)
LogRealGDPdiff	-0.935 (0.610)	-0.919 (0.623)								
LogSpatialLag	0.080 (0.071)	0.079 (0.061)	-0.303 (0.202)	-0.190 (0.158)			-0.469*** (0.093)	-0.465*** (0.088)		
OldDependencyRatio					0.019 (0.031)	0.015 (0.033)				
SkillLevel					-0.001 (0.010)	0.001 (0.010)	-0.007 (0.005)	-0.007 (0.005)	-0.003 (0.005)	-0.006** (0.003)
LogPopulationDensity	-0.080 (0.939)	-0.336 (0.837)	0.797 (2.853)	0.885 (2.562)	2.857 (1.974)	2.962 (1.968)			8.213*** (1.481)	7.267*** (1.435)
TFP	0.006 (0.006)	0.005 (0.006)	-0.002 (0.023)	-0.003 (0.019)						
TradeOpenness	0.008*** (0.002)	0.009*** (0.002)					0.018*** (0.002)	0.018*** (0.002)		
RevenueTradeTaxes			0.053 (0.175)	0.041 (0.132)						
KOFSoGldf	-0.023** (0.012)	-0.021** (0.011)								



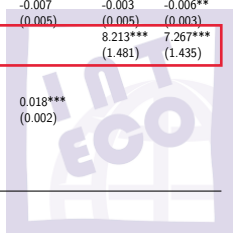
Benchmark model specification

Variables	Whole group		EU countries		EA countries		EA core		EA periphery	
	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML
EU	0.522* (0.277)	0.531* (0.276)	0.386 (0.358)	0.363 (0.298)						
Euro	0.040 (0.126)	0.028 (0.117)	-0.041 (0.094)	-0.036 (0.080)	0.353* (0.190)	0.354* (0.208)	0.139* (0.073)	0.140** (0.068)	0.207* (0.111)	0.293*** (0.090)
LogRealGDP	0.781** (0.389)	0.821** (0.385)	1.878* (1.076)	2.037** (0.953)	1.911*** (0.426)	1.829*** (0.406)	2.910*** (0.659)	2.900*** (0.651)	1.320*** (0.324)	1.258*** (0.359)
UrbanPopulation					0.099*** (0.015)	0.103*** (0.015)	0.050*** (0.006)	0.050*** (0.006)	-0.044 (0.052)	-0.030 (0.027)
LogRealGDPdiff	-0.935 (0.610)	-0.919 (0.623)								
LogSpatialLag	0.080 (0.071)	0.079 (0.061)	-0.303 (0.202)	-0.190 (0.158)			-0.469*** (0.093)	-0.465*** (0.088)		
OldDependencyRatio					0.019 (0.031)	0.015 (0.033)				
SkillLevel					-0.001 (0.010)	0.001 (0.010)	-0.007 (0.005)	-0.007 (0.005)	-0.003 (0.005)	-0.006** (0.003)
LogPopulationDensity	-0.080 (0.939)	-0.336 (0.837)	0.797 (2.853)	0.885 (2.562)	2.857 (1.974)	2.962 (1.968)			8.213*** (1.481)	7.267*** (1.435)
TFP	0.006 (0.006)	0.005 (0.006)	-0.002 (0.023)	-0.003 (0.019)						
TradeOpenness	0.008*** (0.002)	0.009*** (0.002)					0.018*** (0.002)	0.018*** (0.002)		
RevenueTradeTaxes			0.053 (0.175)	0.041 (0.132)						
KOFSoGldf	-0.023** (0.012)	-0.021** (0.011)								



Benchmark model specification

Variables	Whole group		EU countries		EA countries		EA core		EA periphery	
	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML
EU	0.522* (0.277)	0.531* (0.276)	0.386 (0.358)	0.363 (0.298)						
Euro	0.040 (0.126)	0.028 (0.117)	-0.041 (0.094)	-0.036 (0.080)	0.353* (0.190)	0.354* (0.208)	0.139* (0.073)	0.140** (0.068)	0.207* (0.111)	0.293*** (0.090)
LogRealGDP	0.781** (0.389)	0.821** (0.385)	1.878* (1.076)	2.037** (0.953)	1.911*** (0.426)	1.829*** (0.406)	2.910*** (0.659)	2.900*** (0.651)	1.320*** (0.324)	1.258*** (0.359)
UrbanPopulation					0.099*** (0.015)	0.103*** (0.015)	0.050*** (0.006)	0.050*** (0.006)	-0.044 (0.052)	-0.030 (0.027)
LogRealGDPdiff	-0.935 (0.610)	-0.919 (0.623)								
LogSpatialLag	0.080 (0.071)	0.079 (0.061)	-0.303 (0.202)	-0.190 (0.158)			-0.469*** (0.093)	-0.465*** (0.088)		
OldDependencyRatio					0.019 (0.031)	0.015 (0.033)				
SkillLevel					-0.001 (0.010)	0.001 (0.010)	-0.007 (0.005)	-0.007 (0.005)	-0.003 (0.005)	-0.006** (0.003)
LogPopulationDensity	-0.080 (0.939)	-0.336 (0.837)	0.797 (2.853)	0.885 (2.562)	2.857 (1.974)	2.962 (1.968)			8.213*** (1.481)	7.267*** (1.435)
TFP	0.006 (0.006)	0.005 (0.006)	-0.002 (0.023)	-0.003 (0.019)						
TradeOpenness	0.008*** (0.002)	0.009*** (0.002)					0.018*** (0.002)	0.018*** (0.002)		
RevenueTradeTaxes			0.053 (0.175)	0.041 (0.132)						
KOFSoGldf	-0.023** (0.012)	-0.021** (0.011)								



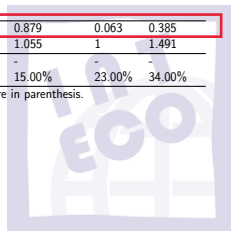
Benchmark model specification

Variables	Whole group		EU countries		EA countries		EA core		EA periphery	
	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML
EU	0.522* (0.277)	0.531* (0.276)	0.386 (0.358)	0.363 (0.298)						
Euro	0.040 (0.126)	0.028 (0.117)	-0.041 (0.094)	-0.036 (0.080)	0.353* (0.190)	0.354* (0.208)	0.139* (0.073)	0.140** (0.068)	0.207* (0.111)	0.293*** (0.090)
LogRealGDP	0.781** (0.389)	0.821** (0.385)	1.878* (1.076)	2.037** (0.953)	1.911*** (0.426)	1.829*** (0.406)	2.910*** (0.659)	2.900*** (0.651)	1.320*** (0.324)	1.258*** (0.359)
UrbanPopulation					0.099*** (0.015)	0.103*** (0.015)	0.050*** (0.006)	0.050*** (0.006)	-0.044 (0.052)	-0.030 (0.027)
LogRealGDPdiff	-0.935 (0.610)	-0.919 (0.623)								
LogSpatialLag	0.080 (0.071)	0.079 (0.061)	-0.303 (0.202)	-0.190 (0.158)			-0.469*** (0.093)	-0.465*** (0.088)		
OldDependencyRatio					0.019 (0.031)	0.015 (0.033)				
SkillLevel					-0.001 (0.010)	0.001 (0.010)	-0.007 (0.005)	-0.007 (0.005)	-0.003 (0.005)	-0.006** (0.003)
LogPopulationDensity	-0.080 (0.939)	-0.336 (0.837)	0.797 (2.853)	0.885 (2.562)	2.857 (1.974)	2.962 (1.968)			8.213*** (1.481)	7.267*** (1.435)
TFP	0.006 (0.006)	0.005 (0.006)	-0.002 (0.023)	-0.003 (0.019)						
TradeOpenness	0.008*** (0.002)	0.009*** (0.002)					0.018*** (0.002)	0.018*** (0.002)		
Revenue Trade Taxes			0.053 (0.175)	0.041 (0.132)						
KOFSoGldf	-0.023** (0.012)	-0.021** (0.011)								

Empirical results

Variables	Whole group		EU countries		EA countries		EA core		EA periphery	
	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML
Chinn-ItoIndex	-0.001 (0.002)	-0.001 (0.002)								
DemoAccountability									0.003 (0.004)	-0.002 (0.004)
TopMarginal	-0.005 (0.006)	-0.002 (0.006)	-0.010 (0.010)	-0.007 (0.009)	-0.025*** (0.009)	-0.027*** (0.008)				
OwnershipBanks	-0.004* (0.003)	-0.003 (0.003)								
InflationCPI			0.002 (0.003)	-0.001 (0.003)						
Cellular	-0.003 (0.002)	-0.003 (0.002)					0.003 (0.003)	0.003 (0.003)		
Internet			-0.003 (0.008)	0.001 (0.008)						
NominalExchange					-0.009*** (0.003)	-0.008** (0.003)				
RESET test p-value	0.439	0.347	0.053	0.294	0.235	0.088	0.886	0.879	0.063	0.385
λ	1	1.178	1	1.183	1	0.891	1	1.055	1	1.491
EU	68.50%	70.10%	0.00%	0.00%	-	-	-	-	-	-
Euro	0.00%	0.00%	0.00%	0.00%	42.30%	42.50%	14.90%	15.00%	23.00%	34.00%

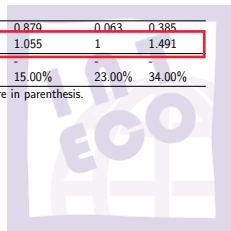
NOTES: ***, ** and * denote significance at levels 1%, 5% and 10%, respectively. Clustered standard errors are in parenthesis.



Empirical results

Variables	Whole group		EU countries		EA countries		EA core		EA periphery	
	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML
Chinn-ItoIndex	-0.001 (0.002)	-0.001 (0.002)								
DemoAccountability									0.003 (0.004)	-0.002 (0.004)
TopMarginal	-0.005 (0.006)	-0.002 (0.006)	-0.010 (0.010)	-0.007 (0.009)	-0.025*** (0.009)	-0.027*** (0.008)				
OwnershipBanks	-0.004* (0.003)	-0.003 (0.003)								
InflationCPI			0.002 (0.003)	-0.001 (0.003)						
Cellular	-0.003 (0.002)	-0.003 (0.002)					0.003 (0.003)	0.003 (0.003)		
Internet			-0.003 (0.008)	0.001 (0.008)						
NominalExchange					-0.009*** (0.003)	-0.008** (0.003)				
RESET test pvalue	0.439	0.347	0.053	0.294	0.235	0.088	0.886	0.879	0.063	0.385
λ	1	1.178	1	1.183	1	0.891	1	1.055	1	1.491
EU	68.50%	70.10%	0.00%	0.00%	-	-	-	-	-	-
Euro	0.00%	0.00%	0.00%	0.00%	42.30%	42.50%	14.90%	15.00%	23.00%	34.00%

NOTES: ***, ** and * denote significance at levels 1%, 5% and 10%, respectively. Clustered standard errors are in parenthesis.

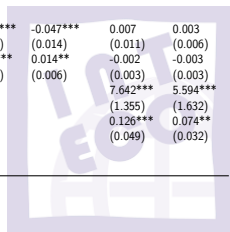


Benchmark model specification

Variables	Whole group		EU countries		EA countries		EA core		EA periphery	
	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML
EU	0.522* (0.277)	0.531* (0.276)	0.386 (0.358)	0.363 (0.298)						
Euro	0.040 (0.126)	0.028 (0.117)	-0.041 (0.094)	-0.036 (0.080)	0.353* (0.190)	0.354* (0.208)	0.139* (0.073)	0.140** (0.068)	0.207* (0.111)	0.293*** (0.090)
LogRealGDP	0.781** (0.389)	0.821** (0.385)	1.878* (1.076)	2.037** (0.953)	1.911*** (0.426)	1.829*** (0.406)	2.910*** (0.659)	2.900*** (0.651)	1.320*** (0.324)	1.258*** (0.359)
UrbanPopulation					0.099*** (0.015)	0.103*** (0.015)	0.050*** (0.006)	0.050*** (0.006)	-0.044 (0.052)	-0.030 (0.027)
LogRealGDPdiff	-0.935 (0.610)	-0.919 (0.623)								
LogSpatialLag	0.080 (0.071)	0.079 (0.061)	-0.303 (0.202)	-0.190 (0.158)			-0.469*** (0.093)	-0.465*** (0.088)		
OldDependencyRatio					0.019 (0.031)	0.015 (0.033)				
SkillLevel					-0.001 (0.010)	0.001 (0.010)	-0.007 (0.005)	-0.007 (0.005)	-0.003 (0.005)	-0.006** (0.003)
LogPopulationDensity	-0.080 (0.939)	-0.336 (0.837)	0.797 (2.853)	0.885 (2.562)	2.857 (1.974)	2.962 (1.968)			8.213*** (1.481)	7.267*** (1.435)
TFP	0.006 (0.006)	0.005 (0.006)	-0.002 (0.023)	-0.003 (0.019)						
TradeOpenness	0.008*** (0.002)	0.009*** (0.002)					0.018*** (0.002)	0.018*** (0.002)		
RevenueTradeTaxes			0.053 (0.175)	0.041 (0.132)						
KOFSoGldf	-0.023** (0.012)	-0.021** (0.011)								

Augmented model specification

Variables	Whole group		EU countries		EA countries		EA core		EA periphery	
	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML
EU	0.462*	0.462*	0.444	0.379						
	(0.257)	(0.257)	(0.382)	(0.306)						
Euro	4.460**	4.453**	4.333**	3.990**	3.414**	2.713*	-3.376*	-3.062*	2.508***	1.965***
	(1.864)	(1.864)	(2.009)	(1.936)	(1.745)	(1.491)	(1.869)	(1.718)	(0.925)	(0.698)
LogRealGDP	1.095***	1.094***	2.513***	2.646***	2.196***	2.248***	2.031***	2.070***	1.631***	1.644***
	(0.359)	(0.360)	(0.935)	(0.949)	(0.512)	(0.493)	(0.502)	(0.522)	(0.296)	(0.364)
Euro*LogRealGDP	-0.234***	-0.234***	-0.262***	-0.237***	-0.126**	-0.108**	0.095	0.088	-0.104***	-0.072***
	(0.084)	(0.084)	(0.083)	(0.088)	(0.062)	(0.054)	(0.068)	(0.066)	(0.035)	(0.022)
UrbanPopulation					0.094***	0.087***	0.038***	0.039***	-0.069	-0.051*
					(0.011)	(0.013)	(0.006)	(0.005)	(0.058)	(0.031)
LogRealGDPdiff	-0.488	-0.488								
	(0.538)	(0.538)								
LogSpatialLag	0.090	0.090	-0.259*	-0.194			-0.548***	-0.533***		
	(0.072)	(0.072)	(0.154)	(0.141)			(0.102)	(0.079)		
OldDependencyRatio					0.037	0.043				
					(0.034)	(0.031)				
SkillLevel					-0.018	-0.023	-0.053***	-0.047***	0.007	0.003
					(0.019)	(0.018)	(0.014)	(0.014)	(0.011)	(0.006)
Euro*SkillLevel					0.007	0.008	0.016***	0.014**	-0.002	-0.003
					(0.008)	(0.008)	(0.006)	(0.006)	(0.003)	(0.003)
LogPopulationDensity	-0.582	-0.584	-0.377	-0.373	2.807	2.705			7.642***	5.594***
	(0.852)	(0.852)	(2.893)	(2.887)	(2.125)	(2.099)			(1.355)	(1.632)
Euro*LogPopulationDensity	0.401**	0.401**	0.556***	0.494***	-0.035	-0.003			0.126***	0.074**
	(0.161)	(0.161)	(0.171)	(0.180)	(0.112)	(0.117)			(0.049)	(0.032)
TFP	0.005	0.005	0.001	-0.002						
	(0.006)	(0.006)	(0.018)	(0.016)						



Empirical results

Variables	Whole group		EU countries		EA countries		EA core		EA periphery	
	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML
TradeOpenness	0.009*** (0.001)	0.009*** (0.001)					0.019*** (0.001)	0.019*** (0.001)		
RevenueTradeTaxes			-0.001 (0.144)	0.035 (0.117)						
KOFSoGldf	-0.024** (0.010)	-0.024** (0.010)								
Chinn-ItoIndex	-0.0005 (0.002)	-0.0005 (0.002)								
DemocraticAccountability									0.002 (0.004)	-0.007 (0.005)
TopMarginal	-0.004 (0.005)	-0.004 (0.005)	-0.007 (0.010)	-0.004 (0.010)	-0.025*** (0.007)	-0.021*** (0.008)				
OwnershipBanks	-0.003 (0.002)	-0.003 (0.002)								
InflationCPI			0.002 (0.003)	0.0002 (0.003)						
Cellular	-0.004* (0.002)	-0.004* (0.002)					0.001 (0.003)	0.002 (0.003)		
Internet			-0.009 (0.010)	-0.006 (0.010)						
NominalExchange					-0.007* (0.004)	-0.006* (0.003)				
RESET test p-value	0.826	0.820	0.007	0.014	0.567	0.979	0.994	0.960	0.001	0.142
λ	1	1.002	1	1.130	1	1.161	1	1.204	1	1.658
EU	58.70%	58.70%	0.00%	0.00%	-	-	-	-	-	-
Euro	8.20%	8.20%	-2.80%	-0.40%	37.20%	41.30%	63.70%	57.10%	17.10%	21.40%

NOTES: ***, ** and * denote significance at levels 1%, 5% and 10%, respectively. Clustered standard errors are in parenthesis.

Augmented model specification

Variables	Whole group		EU countries		EA countries		EA core		EA periphery	
	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML
EU	0.462*	0.462*	0.444	0.379						
	(0.257)	(0.257)	(0.382)	(0.306)						
Euro	4.460**	4.453**	4.333**	3.990**	3.414**	2.713*	-3.376*	-3.062*	2.508***	1.965***
	(1.864)	(1.864)	(2.009)	(1.936)	(1.745)	(1.491)	(1.869)	(1.718)	(0.925)	(0.698)
LogRealGDP	1.095***	1.094***	2.513***	2.646***	2.196***	2.248***	2.031***	2.070***	1.631***	1.644***
	(0.359)	(0.360)	(0.935)	(0.949)	(0.512)	(0.493)	(0.502)	(0.522)	(0.296)	(0.364)
Euro*LogRealGDP	-0.234***	-0.234***	-0.262***	-0.237***	-0.126**	-0.108**	0.095	0.088	-0.104***	-0.072***
	(0.084)	(0.084)	(0.083)	(0.088)	(0.062)	(0.054)	(0.068)	(0.066)	(0.035)	(0.022)
UrbanPopulation					0.094***	0.087***	0.038***	0.039***	-0.069	-0.051*
					(0.011)	(0.013)	(0.006)	(0.005)	(0.058)	(0.031)
LogRealGDPdiff	-0.488	-0.488								
	(0.538)	(0.538)								
LogSpatialLag	0.090	0.090	-0.259*	-0.194			-0.548***	-0.533***		
	(0.072)	(0.072)	(0.154)	(0.141)			(0.102)	(0.079)		
OldDependencyRatio					0.037	0.043				
					(0.034)	(0.031)				
SkillLevel					-0.018	-0.023	-0.053***	-0.047***	0.007	0.003
					(0.019)	(0.018)	(0.014)	(0.014)	(0.011)	(0.006)
Euro*SkillLevel					0.007	0.008	0.016***	0.014**	-0.002	-0.003
					(0.008)	(0.008)	(0.006)	(0.006)	(0.003)	(0.003)
LogPopulationDensity	-0.582	-0.584	-0.377	-0.373	2.807	2.705			7.642***	5.594***
	(0.852)	(0.852)	(2.893)	(2.887)	(2.125)	(2.099)			(1.355)	(1.632)
Euro*LogPopulationDensity	0.401**	0.401**	0.556***	0.494***	-0.035	-0.003			0.126***	0.074**
	(0.161)	(0.161)	(0.171)	(0.180)	(0.112)	(0.117)			(0.049)	(0.032)
TFP	0.005	0.005	0.001	-0.002						
	(0.006)	(0.006)	(0.018)	(0.016)						

Augmented model specification

Variables	Whole group		EU countries		EA countries		EA core		EA periphery	
	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML
EU	0.462* (0.257)	0.462* (0.257)	0.444 (0.382)	0.379 (0.306)						
Euro	4.460** (1.864)	4.453** (1.864)	4.333** (2.009)	3.990** (1.936)	3.414** (1.745)	2.713* (1.491)	-3.376* (1.869)	-3.062* (1.718)	2.508*** (0.925)	1.965*** (0.698)
LogRealGDP	1.095*** (0.359)	1.094*** (0.360)	2.513*** (0.935)	2.646*** (0.949)	2.196*** (0.512)	2.248*** (0.493)	2.031*** (0.502)	2.070*** (0.522)	1.631*** (0.296)	1.644*** (0.364)
Euro*LogRealGDP	-0.234*** (0.084)	-0.234*** (0.084)	-0.262*** (0.083)	-0.237*** (0.088)	-0.126** (0.062)	-0.108** (0.054)	0.095 (0.068)	0.088 (0.066)	-0.104*** (0.035)	-0.072*** (0.022)
UrbanPopulation					0.094*** (0.011)	0.087*** (0.013)	0.038*** (0.006)	0.039*** (0.005)	-0.069 (0.058)	-0.051* (0.031)
LogRealGDPdiff	-0.488 (0.538)	-0.488 (0.538)								
LogSpatialLag	0.090 (0.072)	0.090 (0.072)	-0.259* (0.154)	-0.194 (0.141)			-0.548*** (0.102)	-0.533*** (0.079)		
OldDependencyRatio					0.037 (0.034)	0.043 (0.031)				
SkillLevel					-0.018 (0.019)	-0.023 (0.018)	-0.053*** (0.014)	-0.047*** (0.014)	0.007 (0.011)	0.003 (0.006)
Euro*SkillLevel					0.007 (0.008)	0.008 (0.008)	0.016*** (0.006)	0.014** (0.006)	-0.002 (0.003)	-0.003 (0.003)
LogPopulationDensity	-0.582 (0.852)	-0.584 (0.852)	-0.377 (2.893)	-0.373 (2.887)	2.807 (2.125)	2.705 (2.099)			7.642*** (1.355)	5.594*** (1.632)
Euro*LogPopulationDensity	0.401** (0.161)	0.401** (0.161)	0.556*** (0.171)	0.494*** (0.180)	-0.035 (0.112)	-0.003 (0.117)			0.126*** (0.049)	0.074** (0.032)
TFP	0.005 (0.006)	0.005 (0.006)	0.001 (0.018)	-0.002 (0.016)						

Augmented model specification

Variables	Whole group		EU countries		EA countries		EA core		EA periphery	
	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML
EU	0.462*	0.462*	0.444	0.379						
	(0.257)	(0.257)	(0.382)	(0.306)						
Euro	4.460**	4.453**	4.333**	3.990**	3.414**	2.713*	-3.376*	-3.062*	2.508***	1.965***
	(1.864)	(1.864)	(2.009)	(1.936)	(1.745)	(1.491)	(1.869)	(1.718)	(0.925)	(0.698)
LogRealGDP	1.095***	1.094***	2.513***	2.646***	2.196***	2.248***	2.031***	2.070***	1.631***	1.644***
	(0.359)	(0.360)	(0.935)	(0.949)	(0.512)	(0.493)	(0.502)	(0.522)	(0.296)	(0.364)
Euro*LogRealGDP	-0.234***	-0.234***	-0.262***	-0.237***	-0.126**	-0.108**	0.095	0.088	-0.104***	-0.072***
	(0.084)	(0.084)	(0.083)	(0.088)	(0.062)	(0.054)	(0.068)	(0.066)	(0.035)	(0.022)
UrbanPopulation					0.094***	0.087***	0.038***	0.039***	-0.069	-0.051*
					(0.011)	(0.013)	(0.006)	(0.005)	(0.058)	(0.031)
LogRealGDPdiff	-0.488	-0.488								
	(0.538)	(0.538)								
LogSpatialLag	0.090	0.090	-0.259*	-0.194			-0.548***	-0.533***		
	(0.072)	(0.072)	(0.154)	(0.141)			(0.102)	(0.079)		
OldDependencyRatio					0.037	0.043				
					(0.034)	(0.031)				
SkillLevel					-0.018	-0.023	-0.053***	-0.047***	0.007	0.003
					(0.019)	(0.018)	(0.014)	(0.014)	(0.011)	(0.006)
Euro*SkillLevel					0.007	0.008	0.016***	0.014**	-0.002	-0.003
					(0.008)	(0.008)	(0.006)	(0.006)	(0.003)	(0.003)
LogPopulationDensity	-0.582	-0.584	-0.377	-0.373	2.807	2.705			7.642***	5.594***
	(0.852)	(0.852)	(2.893)	(2.887)	(2.125)	(2.099)			(1.355)	(1.632)
Euro*LogPopulationDensity	0.401**	0.401**	0.556***	0.494***	-0.035	-0.003			0.126***	0.074**
	(0.161)	(0.161)	(0.171)	(0.180)	(0.112)	(0.117)			(0.049)	(0.032)
TFP	0.005	0.005	0.001	-0.002						
	(0.006)	(0.006)	(0.018)	(0.016)						

Empirical results

Variables	Whole group		EU countries		EA countries		EA core		EA periphery	
	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML
TradeOpenness	0.009*** (0.001)	0.009*** (0.001)					0.019*** (0.001)	0.019*** (0.001)		
RevenueTradeTaxes			-0.001 (0.144)	0.035 (0.117)						
KOFSoGldf	-0.024** (0.010)	-0.024** (0.010)								
Chinn-ItoIndex	-0.0005 (0.002)	-0.0005 (0.002)								
DemocraticAccountability									0.002 (0.004)	-0.007 (0.005)
TopMarginal	-0.004 (0.005)	-0.004 (0.005)	-0.007 (0.010)	-0.004 (0.010)	-0.025*** (0.007)	-0.021*** (0.008)				
OwnershipBanks	-0.003 (0.002)	-0.003 (0.002)								
InflationCPI			0.002 (0.003)	0.0002 (0.003)						
Cellular	-0.004* (0.002)	-0.004* (0.002)					0.001 (0.003)	0.002 (0.003)		
Internet			-0.009 (0.010)	-0.006 (0.010)						
NominalExchange					-0.007* (0.004)	-0.006* (0.003)				
RESET test p-value	0.826	0.820	0.007	0.014	0.567	0.979	0.994	0.960	0.001	0.142
λ	1	1.002	1	1.130	1	1.161	1	1.204	1	1.658
EU	58.70%	58.70%	0.00%	0.00%	-	-	-	-	-	-
Euro	8.20%	8.20%	-2.80%	-0.40%	37.20%	41.30%	63.70%	57.10%	17.10%	21.40%

NOTES: ***, ** and * denote significance at levels 1%, 5% and 10%, respectively. Clustered standard errors are in parenthesis.

Empirical results

Variables	Whole group		EU countries		EA countries		EA core		EA periphery	
	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML
TradeOpenness	0.009*** (0.001)	0.009*** (0.001)					0.019*** (0.001)	0.019*** (0.001)		
RevenueTradeTaxes			-0.001 (0.144)	0.035 (0.117)						
KOFSoGldf	-0.024** (0.010)	-0.024** (0.010)								
Chinn-ItoIndex	-0.0005 (0.002)	-0.0005 (0.002)								
DemocraticAccountability									0.002 (0.004)	-0.007 (0.005)
TopMarginal	-0.004 (0.005)	-0.004 (0.005)	-0.007 (0.010)	-0.004 (0.010)	-0.025*** (0.007)	-0.021*** (0.008)				
OwnershipBanks	-0.003 (0.002)	-0.003 (0.002)								
InflationCPI			0.002 (0.003)	0.0002 (0.003)						
Cellular	-0.004* (0.002)	-0.004* (0.002)					0.001 (0.003)	0.002 (0.003)		
Internet			-0.009 (0.010)	-0.006 (0.010)						
NominalExchange					-0.007* (0.004)	-0.006* (0.003)				
RESET test p.value	0.826	0.820	0.007	0.014	0.567	0.979	0.994	0.960	0.001	0.142
λ	1	1.002	1	1.130	1	1.161	1	1.204	1	1.658
EU	58.70%	58.70%	0.00%	0.00%	-	-	-	-	-	-
Euro	8.20%	8.20%	-2.80%	-0.40%	37.20%	41.30%	63.70%	57.10%	17.10%	21.40%

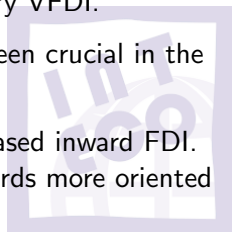
NOTES: ***, ** and * denote significance at levels 1%, 5% and 10%, respectively. Clustered standard errors are in parenthesis.

Augmented model specification

Variables	Whole group		EU countries		EA countries		EA core		EA periphery	
	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML	PPML	G-PPML
EU	0.462* (0.257)	0.462* (0.257)	0.444 (0.382)	0.379 (0.306)						
Euro	4.460** (1.864)	4.453** (1.864)	4.333** (2.009)	3.990** (1.936)	3.414** (1.745)	2.713* (1.491)	-3.376* (1.869)	-3.062* (1.718)	2.508*** (0.925)	1.965*** (0.698)
LogRealGDP	1.095*** (0.359)	1.094*** (0.360)	2.513*** (0.935)	2.646*** (0.949)	2.196*** (0.512)	2.248*** (0.493)	2.031*** (0.502)	2.070*** (0.522)	1.631*** (0.296)	1.644*** (0.364)
Euro*LogRealGDP	-0.234*** (0.084)	-0.234*** (0.084)	-0.262*** (0.083)	-0.237*** (0.088)	-0.126** (0.062)	-0.108** (0.054)	0.095 (0.068)	0.088 (0.066)	-0.104*** (0.035)	-0.072*** (0.022)
UrbanPopulation					0.094*** (0.011)	0.087*** (0.013)	0.038*** (0.006)	0.039*** (0.005)	-0.069 (0.058)	-0.051* (0.031)
LogRealGDPdiff	-0.488 (0.538)	-0.488 (0.538)								
LogSpatialLag	0.090 (0.072)	0.090 (0.072)	-0.259* (0.154)	-0.194 (0.141)			-0.548*** (0.102)	-0.533*** (0.079)		
OldDependencyRatio					0.037 (0.034)	0.043 (0.031)				
SkillLevel					-0.018 (0.019)	-0.023 (0.018)	-0.053*** (0.014)	-0.047*** (0.014)	0.007 (0.011)	0.003 (0.006)
Euro*SkillLevel					0.007 (0.008)	0.008 (0.008)	0.016*** (0.006)	0.014** (0.006)	-0.002 (0.003)	-0.003 (0.003)
LogPopulationDensity	-0.582 (0.852)	-0.584 (0.852)	-0.377 (2.893)	-0.373 (2.887)	2.807 (2.125)	2.705 (2.099)			7.642*** (1.355)	5.594*** (1.632)
Euro*LogPopulationDensity	0.401** (0.161)	0.401** (0.161)	0.556*** (0.171)	0.494*** (0.180)	-0.035 (0.112)	-0.003 (0.117)			0.126*** (0.049)	0.074** (0.032)
TFP	0.005 (0.006)	0.005 (0.006)	0.001 (0.018)	-0.002 (0.016)						

Conclusions

- Our results suggest that EU membership has had a larger impact on US FDI than the launching of the euro when we consider the larger group of countries.
- However, within the EU, monetary integration has generally increased US FDI in those countries that finally adopted the single currency. This effect ranges between 15% and 64%.
- *Euro* with other determinants explain essential changes in the patterns of US FDI in Europe. The common currency has increased VFDI, and in the case of the EA core, intra-industry VFDI.
- Therefore, the creation of the Single Market has been crucial in the attraction of FDI from outside the EU.
- In addition, within the EU, the euro has also increased inward FDI. Furthermore, it has also changed FDI drivers, towards more oriented VFDI.



Appendix A Groups of countries

Table: Groups of countries

Groups of countries	Countries included	Number of countries
Whole group	Argentina, Australia, Austria, Belgium, Bolivia, Brazil, Canada, Chile, China, Colombia, Costa Rica, Cyprus, Denmark, Dominican Republic, Ecuador, Egypt, Finland, France, Germany, Greece, Guatemala, Honduras, Hungary, India, Indonesia, Ireland, Israel, Italy, Jamaica, Japan, Kenya, Malaysia, Mexico, Morocco, Netherlands, New Zealand, Nicaragua, Norway, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Republic of Korea, Romania, Senegal, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Thailand, Turkey, United Kingdom, and Uruguay	56
EU countries	Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Poland, Portugal, Romania, Spain, Sweden and United Kingdom.	18
EA countries	Austria, Belgium, Cyprus, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain.	12
EA core countries	Austria, Belgium, France, Germany and Netherlands.	5
EA peripheral countries	Cyprus, Finland, Greece, Ireland, Italy, Portugal and Spain.	7

Appendix B Selected variables and definitions

Table: Groups of countries

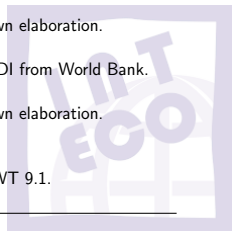
Variable	Definition	Source
Dependent variable		
USFDIstock	Outward FDI stock from the United States to the host country at current U.S. dollars.	Bureau of Economic Analysis.
Economic and monetary integration		
EU	Dummy variable which takes value 1 if the host country is in the EU, 0 otherwise.	Own elaboration.
Euro	Variable which takes value 1 if the host country is outside the ERM with a currency pegged to D-Mark/ECU/Euro, 2 if its currency is pegged to the ECU/euro via the ERM, 3 if its currency is the euro, and 0 otherwise.	Own elaboration.
Market size and population		
LogRealGDP	Logarithm of the host country's real GDP at constant 2010 US dollars.	WDI from World Bank and WEO from IMF.
Euro*LogRealGDP	Interaction between the variable Euro and the logarithm of the host country's real GDP.	Own elaboration.
UrbanPopulation	Percentage of population of the host country living in urban areas.	WDI from World Bank.
LogRealGDPdiff	Logarithm of the absolute difference between the host country's and US real GDP at constant 2010 US dollars.	WDI from World Bank and WEO from IMF.



Appendix B Selected variables and definitions

Table: Groups of countries

Variable	Definition	Source
LogSpatialLag	Logarithm of the sum of US OFDI stock in the host country neighbours weighted by distance between host and neighbouring capital cities.	Own elaboration.
OldDependencyRatio	Ratio of older dependents, people older than 64, to the working-age population, those ages 15-64 of the host country.	WDI from World Bank.
Labour market		
SkillLevel	Skill level of the host country measured as the percentage of population age 25 + with completed and uncompleted secondary schooling.	Education statistics from World Bank and UNDP.
Euro*SkillLevel	Interaction between the variable Euro and the skill level of the host country.	Own elaboration.
LogPopulationDensity	Logarithm of the population density of the host country.	WDI from World Bank.
Euro*LogPopulationDensity	Interaction between the variable Euro and the logarithm of the population density of the host country.	Own elaboration.
TFP	Total factor productivity of the host country at constant national prices (2011=1).	PWT 9.1.



Appendix B Selected variables and definitions

Table: Groups of countries

Variable	Definition	Source
Trade and international openness		
TradeOpenness	Total imports and exports of the host country divided by total GDP at current US dollars.	WDI from World Bank.
RevenueTradeTaxes	Revenue from trade taxes (% of trade sector) of the host country. It measures the amount of tax on international trade as a share of exports and imports.	Fraser Institute.
KOFSoGldf	KOF de facto social globalization index of the host country	Gygli et al. (2019)
Investment Openness		
Chinn-ItoIndex	Index measuring the degree of capital account openness of the host country. It ranges from 0 to 100, being a higher score a higher degree of capital account openness.	Chinn and Ito (2006)
Institutional quality		
DemocraticAccountability	Index measuring how responsive government is to its people in the host country. It ranges from 0 to 100, being a higher score a higher level of democratic accountability.	International Country Risk Guide.
Government size		
TopMarginal	Top marginal income tax rates of the host country.	Fraser Institute.



Appendix B Selected variables and definitions

Table: Groups of countries

Variable	Definition	Source
Banking and credit regulations		
OwnershipBanks	Index measuring the percentage of bank deposits held in privately owned banks in the host country. It ranges from 0 to 100, being a higher score a higher share of privately held deposits.	Fraser Institute.
Monetary conditions		
InflationCPI	Inflation level of the host country measured by the the annual percentage change of the Consumer Prices Index.	WDI from World Bank and WEO from IMF.
Communications infrastructure		
Cellular	Mobile cellular subscriptions of the host country per 100 people.	WDI from World Bank.
Internet	Individuals using the Internet in the host country per 100 people.	WDI from World Bank.
NominalExchange	Nominal exchange rate between the US and the host country, measured as the value of a US dollar in foreign currency. 2010=100.	WDI from World Bank.

