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# **What Types of Capital Flows Improve International Risk Sharing? Remittances!**

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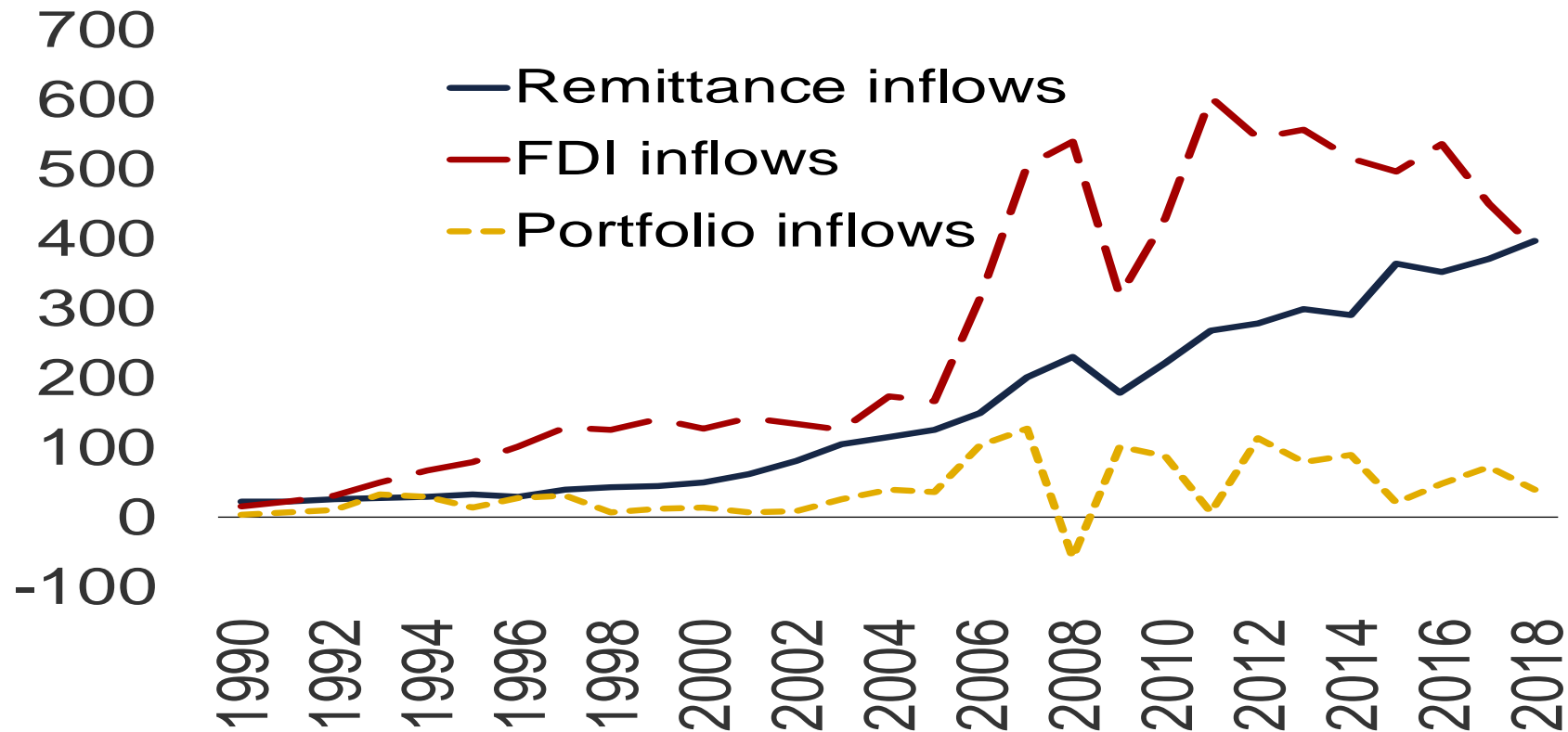
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# Motivation - 1

Foreign flows to emerging market and developing economies (*Total inflows*)

Billions of current US dollars



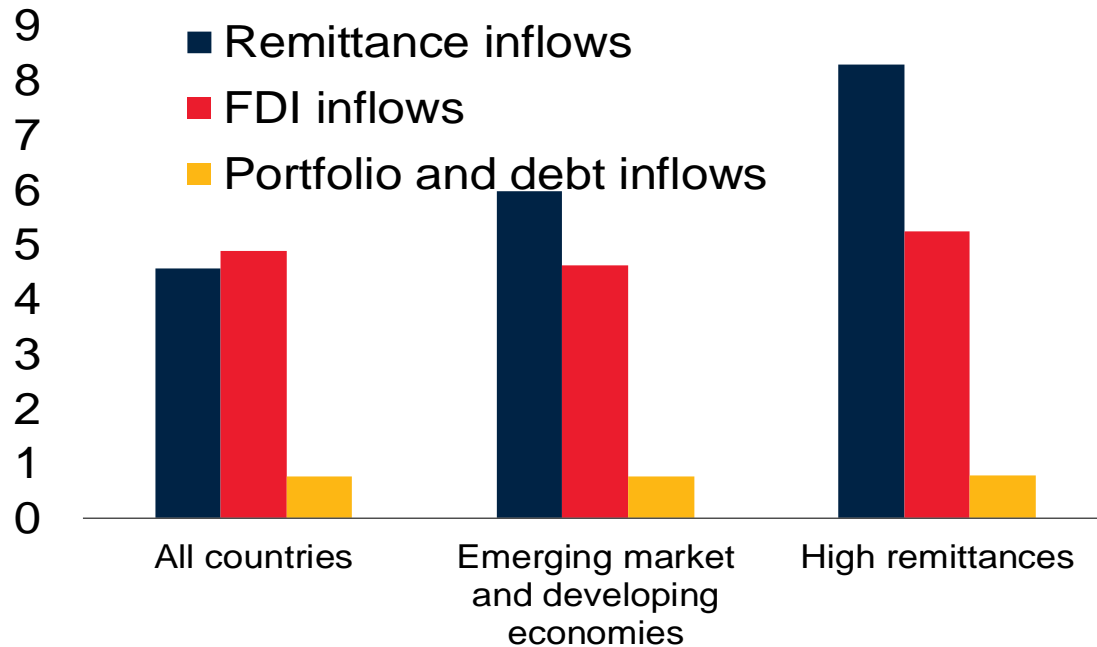
Sources: World Bank's World Development Indicators and IMF Balance of Payments.

Notes: Sum of 79 EMDE economies.

# Motivation - 2

## Foreign flows to emerging market and developing economies

### A. Inflows as a share of GDP



### B. Inflows as a share of GDP, selected economies

Country	Remittances to GDP (2016-19)	Financial flows to GDP (2016-19)
Honduras	19.5	5.8
Lebanon	13.8	7.7
Georgia	11.4	10.7
Ukraine	10.6	4.7
Jordan	10.5	4.9
Philippines	9.7	3.0
Egypt, Arab Rep.	8.8	4.7
Vietnam	6.6	6.3
<b>Median</b>	<b>2.2</b>	<b>3.0</b>

Sources: World Bank's World Development Indicators and IMF Balance of Payments.

Notes: A. Unweighted averages (2009-18). B. Financial flows refer to the sum of FDI, portfolio equity and debt inflows.

# Question

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- What types of capital flows help improve international risk sharing?
  - Remittances!

# Background

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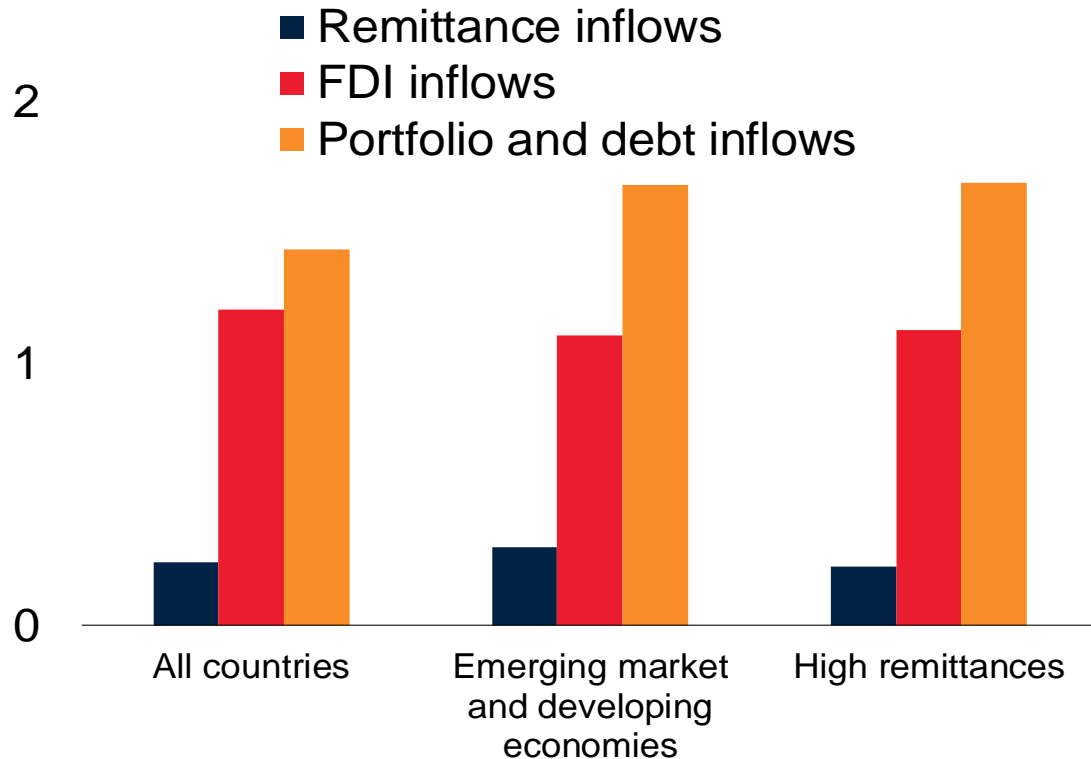
- **Theory:** Foreign inflows should improve international risk sharing
  - *Ex-ante* sharing of risks through portfolio flows: Obstfeld 1994; Lewis 1996
  - *Ex-post* sharing of risks through debt flows: Asdrubali and Kim 2008
- **Empirical evidence:** Mixed evidence on risk sharing benefits of capital inflows
  - Kose et al. 2007, 2009; Fratzcher and Imbs 2009; Bai and Zhang 2012; Hevia and Servén 2018.
  - Gains mainly detectable for (i) advanced economies; (ii) capital flows such as FDI (for advanced economies) and not for equity and debt flows; (iii) countries with better institutions; (iv) similarities of shocks across countries

# Remittances and international risk sharing- 1

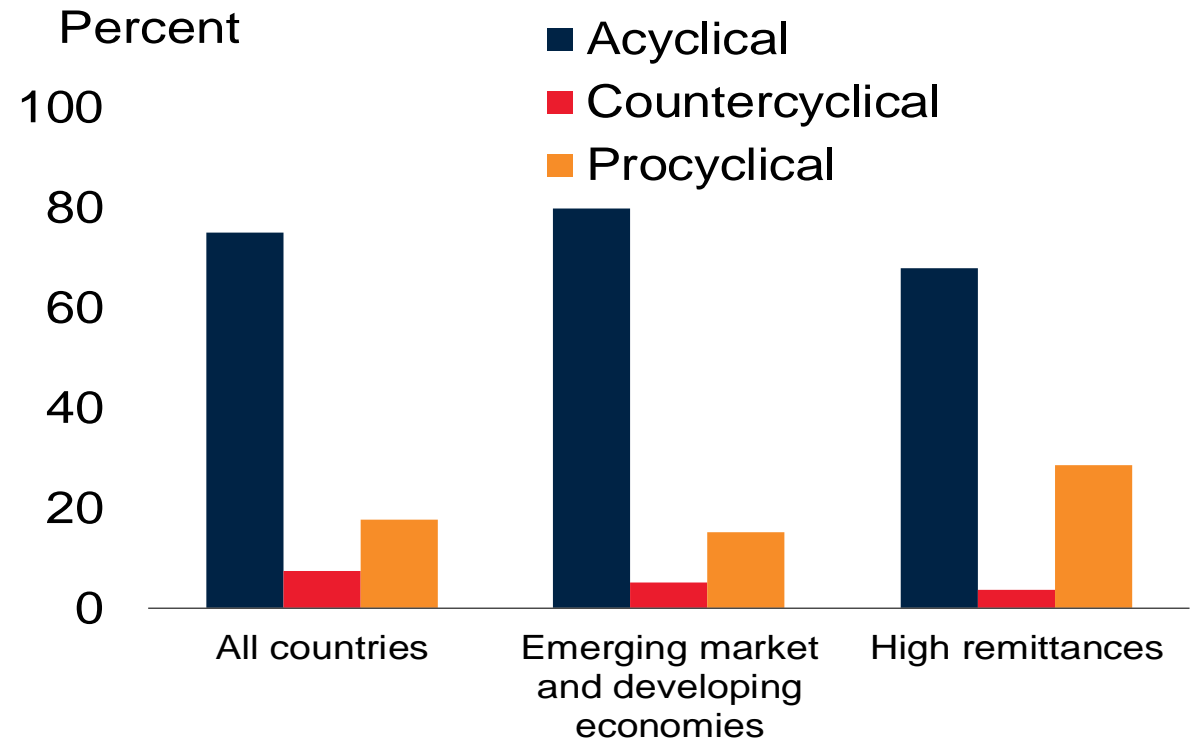
- **Theory:** Closely related to the motives to remit (Acosta et al. 2009; De et al. 2019)
  - If altruistic, counter-cyclical and lead to lower sensitivity of consumption to income; If self-interest, used for investment, pro-cyclical, higher co-movement between consumption and output
  - **Channels:** (i) used to stabilize consumption inter-temporally by supporting saving and improving access to financial services; (ii) used for consumption during economic downturns rather than investment; (iii) unrequited transfers and target the portion of consumers that is likely to be liquidity constrained
- **Empirical evidence:** Remittances help reduce macroeconomic volatility
  - lower output volatility (Bugamelli and Paterno 2011)
  - de-link national income from *output* (Balli and Rana 2015)

# Remittances and international risk sharing - 2

## A. Volatility of inflows



## B. Cyclicity of remittances



Sources: World Bank's World Development Indicators and IMF Balance of Payments.

Notes: A. Median across countries for each group. Volatility is defined as the standard deviation of the detrended ratio of the relevant inflow to GDP. B. Cyclicity is defined as the correlation between the detrended (using a Hodrick-Prescott filter) real series of GDP and remittance inflows. *Procyclical*: correlation of cyclical components of remittances and output is positive and statistically different from zero; *countercyclical*: negative and statistically different from zero; and *acyclical*: not statistically different from zero.

# Database

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- Coverage: 79 emerging market and developing economies (EMDEs); 1990-2018
- Data series: Real consumption and real GDP (per capita); remittance inflows, Total liabilities/flows, FDI/portfolio/debt liabilities/flows; de-jure financial integration; trade openness (exports plus imports as a share to GDP)
- Sources: World Bank World Development Indicators; IMF Balance of Payment Statistics – BPM6; Chinn-Ito (2006); Lane and Milesi-Ferretti (2017); United Nations



# Empirical approach: *Basic regression*

Basic risk-sharing regression based on standard literature on implications of the consumption Euler Equation (Obstfeld 1994; Lewis 1996)

$$\Delta c_{t+1}^j - \Delta c_{t+1} = \alpha + \beta(\Delta y_{t+1}^j - \Delta y_{t+1}) + \epsilon_{t+1}^j$$

- $\Delta c_{t+1}^j$  ( $\Delta y_{t+1}^j$ ) denotes country  $j$  consumption (output) per capita growth at time  $t + 1$ ;
- $\Delta c_{t+1}$  ( $\Delta y_{t+1}$ ) denotes world consumption (output) growth at time  $t + 1$ ;
- $\epsilon_{t+1}^j$  follows a stationary process and represents measurement error in consumption; and
- **$\beta$  measures the extent of risk sharing** (Asdrubali et al., 1996; Kose et al., 2009)

# Empirical approach: *Impact of financial flows*

To estimate the quantitative effects of foreign flows, focus on the impact of each type of flows on the comovement between country-specific consumption and output growth (Lewis 1996; Kose, Prasad and Terrones 2009)

$$\Delta c_{t+1}^j - \Delta c_{t+1} = \alpha + \beta(\Delta y_{t+1}^j - \Delta y_{t+1}) + \delta I_{jt}(\Delta y_{t+1}^j - \Delta y_{t+1}) + \epsilon_{t+1}^j$$

- $I_{jt}$  represents the remittance inflows or other cross-border financial flows (% of GDP) at time  $t$ .
- **A negative  $\delta$**  suggests that the variable of interest ( $I_{jt}$ ) can help lower the sensitivity of country-specific consumption growth to country-specific output fluctuations,
- **and thus, is associated with better international risk sharing**

# Empirical approach: *Estimation method*

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- Dynamic panel framework
- Generalized least square (GLS) estimates for panel data that allows
  - estimation in the presence of  $AR(1)$  autocorrelation within panels
  - cross-sectional correlation and heteroskedasticity across panels (Ostergaard, Sorensen and Yosha 2002)
- Country groups
  - emerging market and developing economies (EMDEs)
  - high-remittance countries: remittances relative to GDP greater than the sample median during the last decade
  - all countries (including EMDEs advanced economies)

# Findings -1

## International risk sharing and remittance inflows

	EMDE	High remittances	All countries	EMDE	High remittances	All countries
<b>Output growth</b>	0.798 [0.021]***	0.838 [0.031]***	0.758 [0.016]***	0.825 [0.031]***	0.755 [0.046]***	0.829 [0.029]***
<b>Remittance inflows</b>	-0.000 [0.000]*	-0.000 [0.000]	0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]
<b>Remittances × Output growth</b>	<b>-0.009</b> [0.004]**	<b>-0.010</b> [0.006]*	<b>-0.006</b> [0.004]*	<b>-0.009</b> [0.004]**	<b>-0.006</b> [0.004]*	<b>-0.007</b> [0.004]**
<b>De- jure</b>				-0.001 [0.002]	-0.004 [0.002]*	-0.004 [0.001]***
<b>De- jure × Output growth</b>				-0.069 [0.059]	0.040 [0.064]	-0.123 [0.039]***
<b>Constant</b>	0.004 [0.003]	0.001 [0.004]	0.003 [0.002]**	0.005 [0.003]	0.004 [0.004]	0.006 [0.002]***
<b>Observations</b>	1,745	1,134	2,606	1,745	1,224	2,606
<b>Number of countries</b>	79	55	110	79	55	110

Sources: World Development Indicators, IMF Balance of Payments. 1990-2018

Notes: Robust standard errors are reported in brackets. Generalized least squares regression model including time fixed effects. Dependent variable:  $(\Delta c_{t+1}^j - \Delta c_{t+1})$ . Output growth:  $(\Delta y_{t+1}^j - \Delta y_{t+1})$ . Remittance inflows: remittances to GDP. EMDE: emerging market and developing economies. “High remittances”: countries with remittance inflows greater than the median during the 2009-2018 period. \*, \*\*, and \*\*\* denote statistical significance at 10, 5, and 1 percent levels, respectively.

# Findings - 2

## Determinants of international risk sharing

	Baseline	Remittance inflows	Personal transfers	FDI inflows	Portfolio equity inflows	Debt inflows	De-jure	Trade Openness
<b>Output growth</b>	0.770 [0.018]***	0.798 [0.021]***	0.831 [0.025]***	0.773 [0.018]***	0.771 [0.018]***	0.772 [0.018]***	0.802 [0.030]***	0.777 [0.040]***
<b>Interaction term</b>		-0.000 [0.000]*	-0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	-0.000 [0.000]	-0.001 [0.002]	0.000 [0.000]
<b>Interaction × Output growth</b>		<b>-0.009</b> [0.004]**	<b>-0.015</b> [0.005]***	-0.000 [0.001]	-0.002 [0.003]	-0.000 [0.000]	-0.076 [0.057]	-0.000 [0.001]
<b>Constant</b>	0.004 [0.003]	0.004 [0.003]	0.005 [0.003]*	0.004 [0.003]	0.004 [0.003]	0.004 [0.003]	0.004 [0.003]	0.003 [0.003]
<b>Observations</b>	1,745	1,745	1,512	1,745	1,745	1,745	1,745	1,745
<b>Number of countries</b>	79	79	75	79	79	79	79	79

Sources: World Development Indicators, IMF Balance of Payments. 1990-2018

Notes: Robust standard errors are reported in brackets. Generalized least squares regression model including time fixed effects. Dependent variable:  $(\Delta c_{t+1}^j - \Delta c_{t+1})$ . Output growth:  $(\Delta y_{t+1}^j - \Delta y_{t+1})$ . Remittance inflows: remittances to GDP. Personal transfers are defined as all current transfers in cash or in kind received by resident households from nonresident households. \*, \*\*, and \*\*\* denote statistical significance at 10, 5, and 1 percent levels, respectively.

# Robustness

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- Additional controls
  - FDI liabilities/inflows, portfolio equity liabilities/inflows, debt liabilities/inflows, trade openness, *de-jure* financial integration
- Alternative time periods
  - 1980-2018; 2000-18
- Alternative estimation methods
  - Panel Fixed-Effects model

# Robustness: *Additional controls*

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- Additional controls
  - FDI liabilities/inflows, portfolio equity liabilities/inflows, debt liabilities/inflows, trade openness, *de-jure* financial integration
- Alternative time periods
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# Robustness: *Additional controls, de facto measures*

## Determinants of international risk sharing

	Total liabilities	FDI liabilities	Portfolio equity liabilities	Debt liabilities	FDI inflows	Portfolio equity inflows	Debt inflows	Trade openness
<b>Output growth</b>	0.799 [0.022]***	0.799 [0.024]***	0.789 [0.024]***	0.803 [0.025]***	0.802 [0.022]***	0.800 [0.022]***	0.802 [0.022]***	0.805 [0.040]***
<b>Remittance inflows</b>	-0.000 [0.000]*	-0.000 [0.000]	-0.000 [0.000]*	-0.000 [0.000]*	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]*	-0.000 [0.000]*
<b>Remittances × Output growth</b>	<b>-0.009</b> [0.004]**	<b>-0.010</b> [0.004]***	<b>-0.009</b> [0.004]**	<b>-0.009</b> [0.004]**	<b>-0.010</b> [0.004]**	<b>-0.010</b> [0.004]**	<b>-0.010</b> [0.004]**	<b>-0.009</b> [0.004]**
<b>Interaction</b>	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	-0.000 [0.000]	0.000 [0.000]
<b>Interaction × Output growth</b>	0.000 [0.000]	0.000 [0.001]	0.003 [0.002]	-0.000 [0.000]	-0.000 [0.001]	-0.003 [0.003]	-0.000 [0.000]	-0.000 [0.001]
<b>Constant</b>	0.004 [0.003]	0.004 [0.003]	0.004 [0.003]	0.004 [0.003]	0.004 [0.003]	0.004 [0.003]	0.004 [0.003]	0.003 [0.003]
<b>Observations</b>	1,745	1,745	1,745	1,745	1,745	1,745	1,745	1,745
<b>Number of countries</b>	<b>79</b>	<b>79</b>	<b>79</b>	<b>79</b>	<b>79</b>	<b>79</b>	<b>79</b>	<b>79</b>

Sources: World Development Indicators, IMF Balance of Payments. 1990-2018

Notes: Robust standard errors are reported in brackets. Generalized least squares regression model including time fixed effects. Dependent variable:  $(\Delta c_{t+1}^j - \Delta c_{t+1})$ . Output growth:  $(\Delta y_{t+1}^j - \Delta y_{t+1})$ . Remittance inflows: remittances to GDP. EMDE: emerging market and developing economies. “High remittances”: countries with remittance inflows greater than the median during the 2009-2018 period. \*, \*\*, and \*\*\* denote statistical significance at 10, 5, and 1 percent levels, respectively.



# Robustness: *Additional controls, de jure measures*

## Determinants of international risk sharing

	Total liabilities	FDI liabilities	Portfolio equity liabilities	Debt liabilities	FDI inflows	Portfolio equity inflows	Debt inflows	Trade openness
<b>Output growth</b>	0.822 [0.031]***	0.819 [0.032]***	0.811 [0.033]***	0.824 [0.033]***	0.822 [0.031]***	0.826 [0.031]***	0.824 [0.031]***	0.820 [0.044]***
<b>Remittance inflows</b>	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]*	-0.000 [0.000]*	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]*
<b>Remittances × Output growth</b>	<b>-0.009</b> [0.004]**	<b>-0.010</b> [0.004]**	<b>-0.009</b> [0.004]**	<b>-0.009</b> [0.004]**	<b>-0.010</b> [0.004]**	<b>-0.009</b> [0.004]**	<b>-0.009</b> [0.004]**	<b>-0.009</b> [0.004]**
<b>Interaction</b>	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	-0.000 [0.000]	0.000 [0.000]
<b>Interaction × Output growth</b>	0.000 [0.000]	0.000 [0.001]	0.003 [0.002]	-0.000 [0.000]	-0.000 [0.001]	-0.002 [0.003]	-0.000 [0.000]	0.000 [0.001]
<b>De- jure integration</b>	-0.001 [0.002]	-0.001 [0.002]	-0.001 [0.002]	-0.001 [0.002]	-0.001 [0.002]	-0.001 [0.002]	-0.001 [0.002]	-0.002 [0.002]
<b>De- jure × Output growth</b>	-0.059 [0.059]	-0.055 [0.061]	-0.058 [0.059]	-0.059 [0.060]	-0.048 [0.059]	-0.066 [0.059]	-0.057 [0.060]	-0.071 [0.061]
<b>Constant</b>	0.005 [0.003]	0.004 [0.003]	0.005 [0.003]*	0.005 [0.003]*	0.005 [0.003]	0.005 [0.003]	0.005 [0.003]	0.003 [0.003]
<b>Observations</b>	1,745	1,745	1,745	1,745	1,745	1,745	1,745	1,745
<b>Number of countries</b>	79	79	79	79	79	79	79	79

Sources: World Development Indicators, IMF Balance of Payments. 1990-2018

Notes: See previous

# Robustness: *Alternative time periods*

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- Additional controls
  - FDI liabilities/inflows, portfolio equity liabilities/inflows, debt liabilities/inflows, trade openness, *de-jure* financial integration,
- Alternative time periods
  - 1980-2018; 2000-18
- Alternative estimation methods
  - Panel Fixed-Effects model

# Robustness: *Alternative time periods, 1980-2018*

## Determinants of international risk sharing

	EMDE	High remittances	All countries	EMDE	High remittances	All countries
<b>Output growth</b>	0.785 [0.018]***	0.813 [0.028]***	0.771 [0.014]***	0.778 [0.025]***	0.746 [0.036]***	0.802 [0.022]***
<b>Remittance inflows</b>	-0.000 [0.000]**	-0.000 [0.000]	0.000 [0.000]	-0.000 [0.000]*	-0.000 [0.000]	-0.000 [0.000]
<b>Remittances × Output growth</b>	<b>-0.009</b> [0.004]**	-0.009 [0.006]	<b>-0.008</b> [0.003]**	<b>-0.010</b> [0.004]***	<b>-0.007</b> [0.004]*	<b>-0.009</b> [0.003]**
<b>De- jure</b>				-0.003 [0.002]	-0.004 [0.002]**	-0.003 [0.001]***
<b>De- jure × Output growth</b>				0.028 [0.052]	0.068 [0.056]	-0.067 [0.034]**
<b>Constant</b>	-0.004 [0.004]	-0.003 [0.005]	0.001 [0.002]	-0.004 [0.004]	-0.001 [0.004]	0.003 [0.002]
<b>Observations</b>	2,095	1,319	3,129	2,095	1,455	3,129
<b>Number of countries</b>	79	55	110	79	55	110

Sources: World Development Indicators, IMF Balance of Payments. 1980-2018

Notes: See previous

# Robustness: *Alternative time periods, 2000-2018*

## Determinants of international risk sharing

	EMDE	High remittances	All countries	EMDE	High remittances	All countries
<b>Output growth</b>	0.802 [0.025]***	0.892 [0.038]***	0.773 [0.018]***	0.809 [0.036]***	0.814 [0.058]***	0.798 [0.036]***
<b>Remittance inflows</b>	-0.000 [0.000]	0.000 [0.000]	-0.000 [0.000]	-0.000 [0.000]	0.000 [0.000]	-0.000 [0.000]
<b>Remittances × Output growth</b>	<b>-0.010</b> [0.003]***	<b>-0.025</b> [0.006]***	<b>-0.009</b> [0.003]***	<b>-0.011</b> [0.004]***	<b>-0.013</b> [0.004]***	<b>-0.009</b> [0.003]***
<b>De- jure</b>				-0.001 [0.002]	-0.005 [0.002]**	-0.004 [0.001]***
<b>De- jure × Output growth</b>				-0.006 [0.065]	0.080 [0.071]	-0.051 [0.046]
<b>Constant</b>	-0.003 [0.002]	-0.002 [0.003]	-0.003 [0.001]*	-0.002 [0.002]	0.000 [0.003]	0.001 [0.002]
<b>Observations</b>	1,227	846	1,835	1,227	886	1,835
<b>Number of countries</b>	79	55	110	79	55	110

Sources: World Development Indicators, IMF Balance of Payments. 2000-2018

Notes: See previous

# Robustness: *Alternative estimation method*

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- Additional controls
  - FDI liabilities/inflows, portfolio equity liabilities/inflows, debt liabilities/inflows, trade openness, *de-jure* financial integration,
- Alternative time periods
  - 1980-2018; 2000-18
- Alternative estimation methods
  - Panel Fixed-Effects model

# Robustness: *Panel Fixed Effects*

## Determinants of international risk sharing: Panel Fixed-Effects

	EMDE	High remittances	All countries	EMDE	High remittances	All countries
<b>Output growth</b>	0.840 [0.029]***	0.807 [0.043]***	0.798 [0.019]***	0.824 [0.037]***	0.790 [0.052]***	0.841 [0.035]***
<b>Remittance inflows</b>	0.000 [0.000]***	0.001 [0.000]***	0.000 [0.000]***	0.001 [0.000]***	0.001 [0.000]***	0.000 [0.000]***
<b>Remittances × Output growth</b>	<b>-0.019</b> [0.004]***	<b>-0.016</b> [0.005]***	<b>-0.014</b> [0.004]***	<b>-0.020</b> [0.005]***	<b>-0.017</b> [0.006]***	<b>-0.014</b> [0.004]***
<b>De- jure</b>				-0.002 [0.002]	-0.003 [0.003]	-0.002 [0.001]
<b>De- jure × Output growth</b>				0.049 [0.074]	0.026 [0.092]	-0.078 [0.045]*
<b>Constant</b>	0.008 [0.005]*	0.004 [0.007]	0.011 [0.002]***	0.008 [0.005]*	0.004 [0.007]	0.012 [0.002]***
<b>Observations</b>	1,314	771	1,996	1,314	771	1,996
<b>Number of ifscode</b>	79	55	110	79	55	110

Sources: World Development Indicators, IMF Balance of Payments. 1990-2018

Notes: See previous

# Conclusions

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- Contrary to the predictions of theory...
- In data, increased financial integration (*capital account liberalization, and increased FDI, equity, and debt flows*) has not been associated with better international risk sharing in developing countries.
- But ***remittances are associated with better international risk sharing outcomes.***
- The result is robust to a wide range of sensitivity exercises.

# Future work

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- Examine the risk-sharing consequences of different types of capital flows using a dynamic multi-country general equilibrium model (Heathcote and Perri 2013; Coeurdacier and Gourinchas 2016)
- Analyze how country-specific characteristics affect risk-sharing outcomes of different types of capital flows, including remittances using micro data



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***Thanks!***  
***Comments & Questions***