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Decomposing the Income Insurance Channel across OECD and Emerging Markets

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ABSTRACT

This paper investigates the underlying forces driving income insurance channels for the Organisation for Economic Co-operation and Development (OECD) and emerging markets. We find income insurance channels across countries to be driven by different subchannels. For the OECD, income insurance is mostly governed by payments for financial liabilities; for the emerging markets, income flows from nationals working abroad constitute the main income smoother. Despite the growth in cross-border financial asset trading over the years, we could not find evidence of income smoothing via foreign assets receipts for the OECD. For the majority of emerging markets, neither receipts of foreign assets nor foreign liability payments are strong enough to insure income as well.

I. INTRODUCTION

Economic and financial integration among countries across the globe has accelerated at a fast pace in recent years, particularly with the removal or easement in cross-border capital restrictions and the advent of advanced telecommunication systems such as the internet that facilitate investing overseas. These changes have propelled the volume of cross-border financial asset trading to previously unseen levels, which has eventually tended to a decline in portfolio home bias.[1] A number of studies including Adjaoutè et al. (2002), Baele et al. (2004), De Santis

1 French and Poterba (1991), and Tesar and Werner (1995) show that investors do not hold foreign financial assets as much as they should optimally as a large portion of their financial assets are from the domestic market, the portfolio 'home bias' phenomenon. In fact, their findings confirm earlier evidence documented in Grauer and Hakansson (1987) that, despite significant gains to be made from international diversification (both in terms of reduced risk and increased returns), investors tend to stick to domestic assets.

and Gerard (2006), Foad (2007), Sørensen et al. (2007), Demyank et al. (2008), Kose et al. (2009), Balli et al. (2010a), and Kang and Melas (2010) documented the rise in capital market integration that took place across developed nations in particular, with an increase in cross-border financial asset trading. These findings align with the strand of international finance literature that views capital market integration as the means to achieve international portfolio diversification. Higher international portfolio diversification (or lower home bias) is presumed to generate higher income risk sharing; home bias likewise is associated with low risk sharing. Hence, home bias and risk sharing can be viewed as manifestations of the same underlying behavior. Sørensen et al. (2007) empirically analyze this hypothesis for the Organisation for Economic Co-operation and Development (OECD) countries. This study shows that more financial integration is associated with a higher volume of cross-border financial asset trading, which, in turn, is associated with more income risk sharing. Their finding supports the view that as investors hold more foreign financial assets, the extent of income insurance increases, since they are able to repatriate income from foreign markets to smooth out domestic consumption over time.

Sørensen et al. (2007) quantify income risk sharing by using the net factor income channel – the difference between gross domestic product (GDP) and gross national income (GNI) – in their analysis. Income insurance, through net factor income flows, can primarily take place via two channels: foreign assets receipts and foreign liability payments. Sørensen et al. (2007) only emphasize the assets side. That is, high-income smoothing will take place if foreign asset receipts and domestic output growth are countercyclical. The subchannel that has not been explored thus far is the liability payments channel. Substantial income smoothing may arise if payments of foreign liabilities are tied to domestic output growth. The basic idea is that countries with sustained output growth tend to record enough surpluses to consider paying down their debt and/or paying out dividends, which are likely to increase net assets, thereby providing a larger buffer for consumption in bad times. Viewed through this lens, the extent of income smoothing may also depend on the degree of co-movement between foreign liability payments and domestic output growth. Indubitably, in highly integrated capital markets such as the OECDs, both foreign liability payments and foreign asset receipts are likely to be important sources of income smoothing. In this respect, one of our contributions to the literature on the importance of financial liability payments for income smoothing complements the work of Sørensen et al. (2007). Our undertaking is justified on two grounds: the findings of Sørensen et al. (2007) and Demyank et al. (2008) document the rise in income smoothing via net factor income and Demyank et al.'s (2008) conclusion that the connection between the level of financial asset holdings and smoothing via factor income flows is not strong enough. These two studies called for further research on the link between net foreign asset holdings and income smoothing.[2]

2 Balli et al. (2010b) and Balli et al. (2011) also followed Sørensen et al. (2007) and found that the extent of income smoothing through net factor income flows and the amount of the foreign asset holdings do not have a strong relationship.

In our attempt to gauge the extent of income smoothing, we decompose net factor income flows into net foreign asset income (foreign asset receipts- foreign liability payments), net tax on imports, and net compensation of employees from abroad.[3] We then use both country-by-country (times series) and panel regression analysis to assess the contribution of each subcategory to income insurance for the OECD and emerging markets. Our findings reveal that factor income outflows, as opposed to net compensation of employees from abroad (which are, by and large, negligible) and foreign asset receipts, are the most important source of income insurance for OECD members. In some of these countries, foreign asset receipts even give rise to income dis-smoothing. The results hold for different subsamples of the OECD countries and for the country-by-country estimates. The net factor income flows is also made up of net compensation of employees from the rest of the world as well, which represents the income flows from nonresident emigrants living abroad. For the OECDs sample analysis, this subchannel is negligible and leads little or no risk sharing. We also find that the emerging markets do not achieve much risk sharing from foreign asset receipts (save for the oil-rich Arabian Gulf countries) or foreign liability payments. However, the compensation of employees from the rest of the world is a strong channel for the emerging markets except a few to smooth the income. For some markets, the corresponding channel smoothes about 12% of domestic income for Tajikistan, 14% for Bermuda, and 9% each for Poland and Senegal, to take a few examples; for others, this channel leads to significant income dis-smoothing: –5% for Jordan, –13% for Lebanon, –11% for Syria, and –4% for Egypt.

The rest of the paper is organized as follows. Section II outlines the empirical methodology. Section III documents and analyzes the data. Section IV discusses the empirical findings for the OECD and emerging markets. Section V concludes the paper.

II. METHODOLOGY

The risk sharing literature has been developed around the basic model of international risk sharing proposed by Obstfeld and Rogoff (1996). This model postulates that both economic agents and countries can share risk with their foreign counterparts, provided that the business cycles of the domestic and the foreign economies are not perfectly synchronized.[4] A number of studies including Cochrane (1991), Mace (1991), Townsend (1994), Baxter and Crucini (1995), and Stockman and Tesar (1995) have tested for full risk sharing using either country-level or individual-level data. However, none of these studies has

3 According to the fifth edition of the IMF's *Balance of Payments Manual*, net factor income is the sum of net income flows from nonimmigrants living abroad (the net compensation of employees from the rest of the world), net tax (subsidy) on imports, and net income from foreign assets (net interest receipts, net dividend receipts, and net retained earnings).

4 For a fuller discussion of theoretical framework, interested readers are referred to the original paper.

found evidence of full risk sharing. In light of these findings, it appears to be more rational to quantify the extent of risk sharing among countries rather than to test the abstract ideal of perfect risk sharing. Besides, it is more appealing – particularly for policy makers – to identify the exact channels through which risk is shared in order to quantify the amount of risk sharing obtained via each channel. Several mechanisms can be used for sharing output risk. The most straightforward one is through international income diversification captured as factor income flows in the national accounts data as the difference between GDP and GNI.[5] Specifically, net factor income flows from abroad explain the difference between income earned by residents in foreign countries and income earned by nonresidents in the domestic economy. This type of risk sharing, namely income smoothing, stems from countries owning assets, and to some extent, income earned by emigrants – in other countries. The main idea underlying income smoothing via net factor income is that domestic economic agents tend to diversify their investments or supply their labor force abroad in the hope of earning income to smooth domestic consumption in bad times. Since this source of income is completely detached from domestic output shocks, it serves as insurance to domestic investors as long as shocks across countries are not perfectly synchronized.

The discussion on risk sharing purports that domestic economic agents can insure their income against country-specific output risks by holding international financial assets or allocating their labor force abroad. By holding foreign financial assets, net factor income flows can partially insulate the idiosyncratic fluctuations in GDP. In this vein, Sørensen et al. (2007) use the following regression equation to measure the income insurance via net factor income flows:

$$\Delta \log \widetilde{GNI}_t^i = constant + \beta_f \Delta \log \widetilde{GDP}_t^i + \varepsilon_{i,t} \quad (1)$$

where $\Delta \log \widetilde{GDP}_t^i$ is the annual change in log GDP per capita in constant prices minus the union-wide counterpart ($\Delta \log GDP_t$), $\Delta \log \widetilde{GNI}_t^i$ is the annual change in log GNI per capita in constant prices minus the union-wide counterpart ($\Delta \log GNI_t$), and $\varepsilon_{i,t}$ is the error term.[6,7] β_f measures the co-movement of a country's GNI growth rate with GDP growth rate. The remaining percentage, $1-\beta_f$, measures the amount of income smoothing via net factor inflows. As β_f approaches zero, GNI and GDP per capita growth rates will be less correlated, resulting in higher income smoothing via the net factor income channel. A

5 GNI was previously called Gross National Product (GNP).

6 'Union-wide' in this paper specifically corresponds to the European Union (EU), European Monetary Union (EMU), or high-income OECD members. If we are to consider the EU, then $\Delta \log \widetilde{GDP}^i$ is equal to the real GDP per capita growth rate of country *i* minus the real GDP per capita growth rate of aggregate EU.

7 It is difficult to calculate the actual worldwide GDP or the GNI or any other aggregates in the text. We take the following shortcut to address the issue: we approximate the 'world GDP' as the total output of the OECD countries with the highest GDPs, as defined by the World Bank classification; on average, these account for 80% of total GDP in the world. Same methodology is applied for the other variables.

value of β_f approaching 1 implies that GNI and GDP per capita growth rates are almost perfectly correlated, and therefore, the net factor income flow channel does not provide any room for income smoothing. We did not restrict β_f to be between zero and one, and therefore it might be higher than 1. For example, GNI growth is oversensitive to GDP growth, the β_f is greater than one, we may experience a negative smoothing (dis-smoothing) via net factor income flows.

A. Decomposition of channel of income smoothing via the net factor income flows

We first decompose the income insurance channel into factor income inflows and outflows. Income inflows (outflows) are then added to (subtracted from) GDP to arrive at the following relationships, which are similar to equation (1):

$$\Delta \log \widetilde{GDPIN_t^i} = constant + \beta_f^+ \Delta \log \widetilde{GDP_t^i} + \varepsilon_{i,t}^+ \tag{2}$$

$$\Delta \log \widetilde{GDPOUT_t^i} = constant + \beta_f^- \Delta \log \widetilde{GDP_t^i} + \varepsilon_{i,t}^- \tag{3}$$

where *GDPIN* = *GDP* + *FACTOR INCOME INFLOW*, *GDPOUT* = *GDP* – *FACTOR INCOME OUTFLOW*. The variables on the left-hand side, $\Delta \log \widetilde{GDPIN_t^i}$ and $\Delta \log \widetilde{GDPOUT_t^i}$ are the annual changes in the differential between each country's measures of income and the union (or aggregate for the emerging markets)-wide counterpart.

β_f^+ and β_f^- are co-movement coefficients to be estimated. Their sum produces the following relationship:

$$\beta_f \approx \beta_f^+ + \beta_f^-. \tag{4}$$

Accordingly, $(1-\beta_f^+)$ and $(1-\beta_f^-)$ measure the amount of income smoothing via the channels of income inflows and outflows, respectively. Furthermore, we decompose net factor income into net foreign assets income (foreign assets receipt minus foreign liabilities payment), net compensation of employees from abroad, and net tax on imports. The income insurance via these three subchannels are calculated as

$$(\Delta \log GDP + \widetilde{NET\ FOR.\ ASSET\ INCOME})_t^i = constant + \beta_{fa} \Delta \log \widetilde{GDP_t^i} + \varepsilon_{fa,t} \tag{5}$$

$$(\Delta \log GDP + \widetilde{NET\ COMP.\ OF\ EMPLOYEE})_t^i = constant + \beta_c \Delta \log \widetilde{GDP_t^i} + \varepsilon_{c,t} \tag{6}$$

$$(\Delta \log GDP + \widetilde{NET\ TAX\ ON\ IMPORT})_t^i = constant + \beta_\tau \Delta \log \widetilde{GDP_t^i} + \varepsilon_{\tau,t}. \tag{7}$$

$\varepsilon_{c,t}$, $\varepsilon_{fa,t}$, and $\varepsilon_{\tau,t}$ are the error terms in the regressions above. The sum of the coefficient estimates establishes the following link:

$$\beta_f \approx \beta_{fa} + \beta_c + \beta_\tau. \tag{8}$$

Again, $(1-\beta_{fa})$, $(1-\beta_c)$, and $(1-\beta_\tau)$ measure the amount of income smoothing via the subchannels of net foreign asset revenues, net compensation of employees from abroad, and net tax on imports, respectively.

Then, we decompose the income smoothing via net foreign asset holdings as foreign asset receipts and foreign liability payments similar to the equations (2) and (3);

$$\Delta \log \widetilde{GDPFIN_t^i} = constant + \beta_{fa}^{+} \Delta \log \widetilde{GDP_t^i} + \varepsilon_{i,t}^{+} \tag{9}$$

$$\Delta \log \widetilde{GDPFOUT_t^i} = constant + \beta_{fa}^{-} \Delta \log \widetilde{GDP_t^i} + \varepsilon_{i,t}^{-} \tag{10}$$

where *GDPFIN = GDP + FOREIGN ASSET RECEIPTS*, *GDPFOUT = GDP – FOREIGN LIABILITY PAYMENTS*. The variables on the left-hand side, $\Delta \log \widetilde{GDPFIN_t^i}$ and $\Delta \log \widetilde{GDPFOUT_t^i}$, are the annual changes in the differential between each country's measures of income and the union (or aggregate for the emerging markets)-wide counterpart. β_{fa}^{+} and β_{fa}^{-} are co-movement coefficients to be estimated and their sum produces

$$\beta_{fa} \approx \beta_{fa}^{+} + \beta_{fa}^{-}. \tag{11}$$

The estimations of all panel regression equations are performed using the two-stage weighted generalized least squares. In the first stage, we obtain the residuals via least squares and draw on these residuals to estimate the weights. In the second stage, the weighted least squares method is performed and the Prais–Winsten transformation is used to correct problems of serial correlations. To account for autocorrelation in the residuals, we assume that the error terms in each equation and for each country follow an Autoregressive (1) [AR(1)] process. We use differenced data at annual frequency. Following Asdrubali et al. (1996), we employ the cross-sectional demeaning of the data to account for the aggregate shocks.

For the country-by-country risk sharing regression analysis, it is difficult to isolate the estimation from intertemporal effect. We solve for the effect of aggregate output growth by demeaning the world aggregates from the national aggregates.[8,9]

III. DATA ANALYSIS

We have employed a large data set to decompose and quantify the channels of income insurance for both emerging and OECD markets for the period 1970–

8 The standard approach of cross-sectionally demeaning the data does not solve this intertemporal effect problem in heterogeneous panels since common shocks may impact differently on each cross-section.

9 Such problems are easier to deal with within the context of a panel data as demonstrated by Asdrubali and Kim (2008). Hence, the coefficient estimates of our time series regressions cannot perfectly be interpreted as evidence of the degree of risk sharing, as some amount of shocks are also absorbed through exchanges of risk over time, which is called intertemporal smoothing.

2007. For the emerging markets, GDP, GNI, net compensation of employees from rest of the world, foreign asset revenues, and foreign liability payments are obtained from the United Nations (UN) *National Accounts Statistics*: *Main Aggregates and Detailed Tables*.[10,11] Population and exchange rates are also taken from the UN National Accounts Database. The consumer price index of each country comes from the International Financial Statistics Database of the International Monetary Fund (IMF). These variables were used to transform the GDP series in real per capita terms. For OECD members, the data set described above was extracted from the *OECD National Accounts*, *Main Aggregates* (Volume I) and *Detailed Tables* (Volume II).[12]

Data on net compensation of employees from abroad are difficult to interpret since the definition sometimes also encompasses remittance transfers from migrants. Based on the IMF's *Balance of Payments Manual*, workers' remittances cover current transfers by migrants who are employed in foreign economies and are considered residents. It goes on to define a migrant as a person who comes to an economy to stay, or who is expected to stay for a year or more. The IMF's definition of workers' remittances distinguishes between migrant labor status and residency status. In fact, in its definition of compensation of employees, the IMF makes another distinction as to who should be considered as a migrant as per residency status. While workers' remittances refer to transfers, compensation of employees refers to remuneration for work and is defined as wages, salaries, and other benefits earned by individuals in economies other than those in which they are residents. Compensation of employees is the income of migrants who have lived in the host countries for less than a year. However, in terms of the residency, some countries are very strict. For example, the oil-rich gulf countries (e.g., Bahrain, Kuwait, Qatar, Oman, Saudi Arabia, and the United Arab Emirates) do not accept immigrants as residents nor do they give them residency status. For an example, a Filipino working in Qatar and sending money back home is considered as a nonresident and his/her transfer payment is classified as 'net compensation of employees from the rest of the world.' Similar treatment is given to other expatriates working in the same region.[13] For temporary workers who have

10 The emerging market sample includes Armenia, Azerbaijan, Bangladesh, the Bahamas, Bahrain, Belarus, Bermuda, Bolivia, Botswana, Brazil, Bulgaria, Chile, Cote d'Ivoire, Colombia, Costa Rica, Egypt, Estonia, Fiji, Georgia, Guatemala, Hungary, Iran, Israel, Jamaica, Jordan, Kazakhstan, Kenya, Kuwait, Kyrgyzstan, Latvia, Lebanon, Lesotho, Lithuania, Mauritius, Moldova, Morocco, Namibia, Nicaragua, Niger, Nigeria, Panama, Papua New Guinea, the Philippines, Poland, Romania, Russia, Saudi Arabia, Senegal, Slovakia, Slovenia, South Africa, Sri Lanka, Syria, Suriname, Tanzania, Tajikistan, Thailand, Trinidad and Tobago, Tunisia, Ukraine, and Yemen.

11 Not all the regression equations were estimated with the entire sample because of problems with the missing data.

12 The OECD sample includes Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Korea, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the UK, and the United States.

13 Figure 3 presents higher ratios of net compensation of employees from the rest of the world to GDP for the Philippines and Bangladesh, which originated from expatriates working in the Gulf region.

Table 1 Descriptive statistics

	Emerging markets				OECD			
	Mean	SD	Skew	Kurt	Mean	SD	Skew	Kurt
ΔGDP	2.03	2.15	–0.21	2.44	2.17	2.25	–0.30	2.05
$\Delta\log(GDP + FOREIGN\ ASSET\ RECEIPTS)$	2.28	3.04	–0.43	2.81	2.38	2.54	–0.21	2.13
$\Delta\log(GDP - FOREIGN\ LIABILITY\ PAYMENTS)$	2.35	2.78	–0.72	3.16	1.98	2.45	–5.66	7.92
$\Delta\log(GDP + NET\ COMP.\ OF\ EMPLOYEE)$	2.39	2.44	–0.38	4.13	2.19	2.27	–0.32	2.41
ΔGNI	2.29	2.21	–0.42	2.45	2.23	2.42	–0.25	2.33
FOREIGN ASSET RECEIPTS/GDP	2.26	5.61	–0.88	34.76	6.26	5.39	2.14	5.45
FOREIGN LIABILITY PAYMENTS/GDP	5.82	5.95	5.99	39.57	8.21	6.05	3.17	14.20
NET TAX ON IMPORT/GDP	–	–	–	–	0.07	1.10	1.23	4.04
NET COMP. OF EMPLOYEE/GDP	3.86	5.50	2.74	8.50	0.35	1.03	0.21	1.38

Note: Time period is between 1970 and 2007. Aggregate variables (GDP, GNI, etc.) are real per capita and in logarithms. SD (cross-section standard deviation) is the time average of $\left[(1/n)\sum_i (X_{it} - \bar{X}_t)^2\right]^{1/2}$ where $\bar{X}_t$ is the average of X_{it} across countries over period t and n is the number of countries. Mean and standard deviation are in percentages. Skew stands for the skewness and Kurt stands for kurtosis. *NET TAX ON IMPORT* data is not available for the emerging markets.

migrated from Eastern Europe to Western Europe after 2004, particularly to countries such as Ireland, Sweden, and UK, their money transfers are classified as compensation of employees from the rest of the world. The same applies to seasonal workers from the Pacific Island countries that come temporarily to Australia and New Zealand to harvest fruit during the summer.

IV. EMPIRICAL FINDINGS

Table 1 displays the descriptive statistics for the main variables used in the paper. GDP and GNI per capita growth rates are 2.03% and 2.29% on average for emerging markets; 2.17% and 2.23% for OECD markets. The variables display some skewness to the left but no excess kurtosis, save for *FOREIGN ASSET RECEIPTS/GDP* and *FOREIGN LIABILITY PAYMENTS/GDP*. *FOREIGN ASSET RECEIPTS/GDP* and *FOREIGN LIABILITY PAYMENTS/GDP* ratios are 6.26% and 8.21% for OECD members, and 2.26% and 5.82% for emerging markets, respectively. This is consistent with earlier studies, which found that the capital inflow/outflow ratios are higher in developed markets. Figures 1 and 2 contain the *FOREIGN ASSET RECEIPTS/GDP* and *FOREIGN LIABILITY PAYMENTS/GDP* ratios over the full sample period for emerging and OECD markets, respectively. Emerging markets display a lower foreign asset receipts to GDP ratio, except for Bahrain, Botswana, Kuwait, Panama, and Saudi Arabia. Further comparison of Figures 1 and 2 indicate that *FOREIGN LIABILITY PAYMENTS/GDP* ratios are converging across OECD and emerging markets, mainly because of relatively higher returns on financial assets in the emerging markets. All OECD markets but Belgium, Japan, Netherlands, Switzerland, and the UK have recorded higher

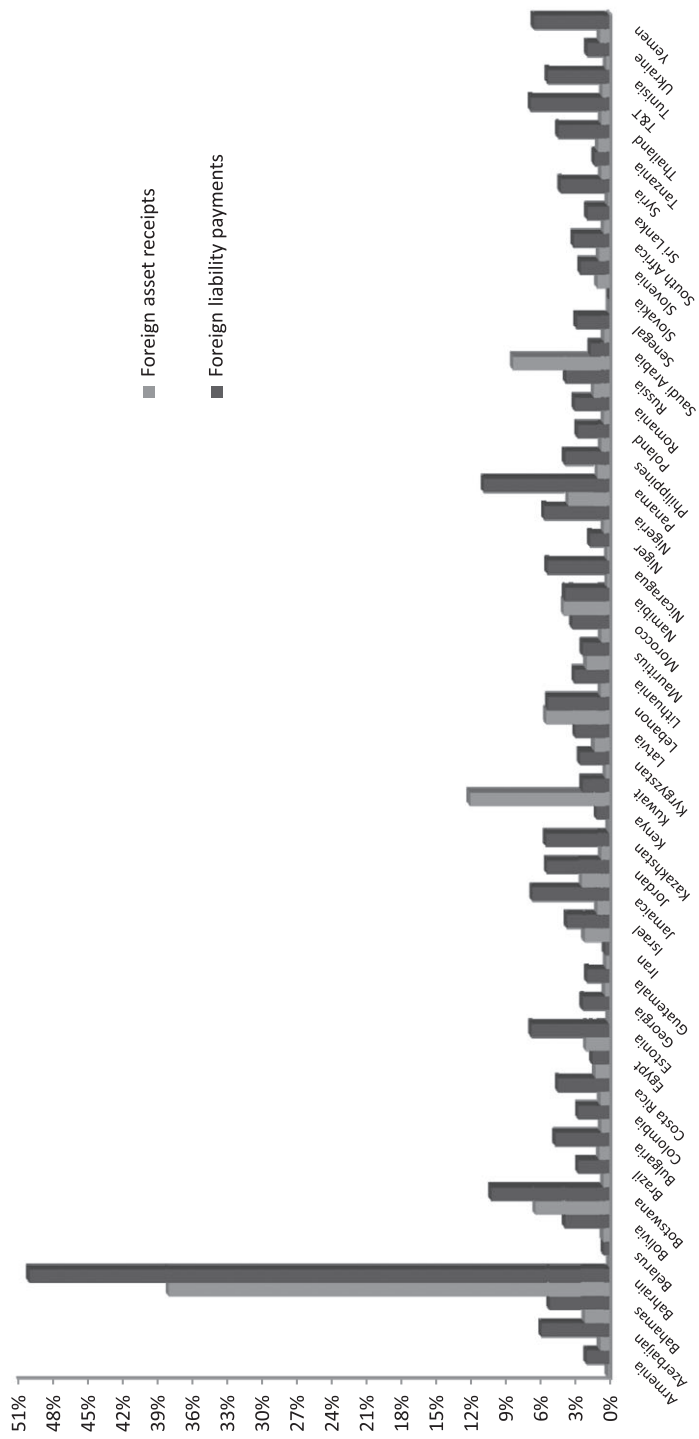

Figure 1 Foreign asset receipts to GDP and foreign liability payments to GDP ratios for emerging markets.
Source: UN Detailed National Accounts Database, and authors' own calculations. Both foreign asset receipts to GDP and foreign liability payments to GDP ratios are averaged for years 1970 to 2007.

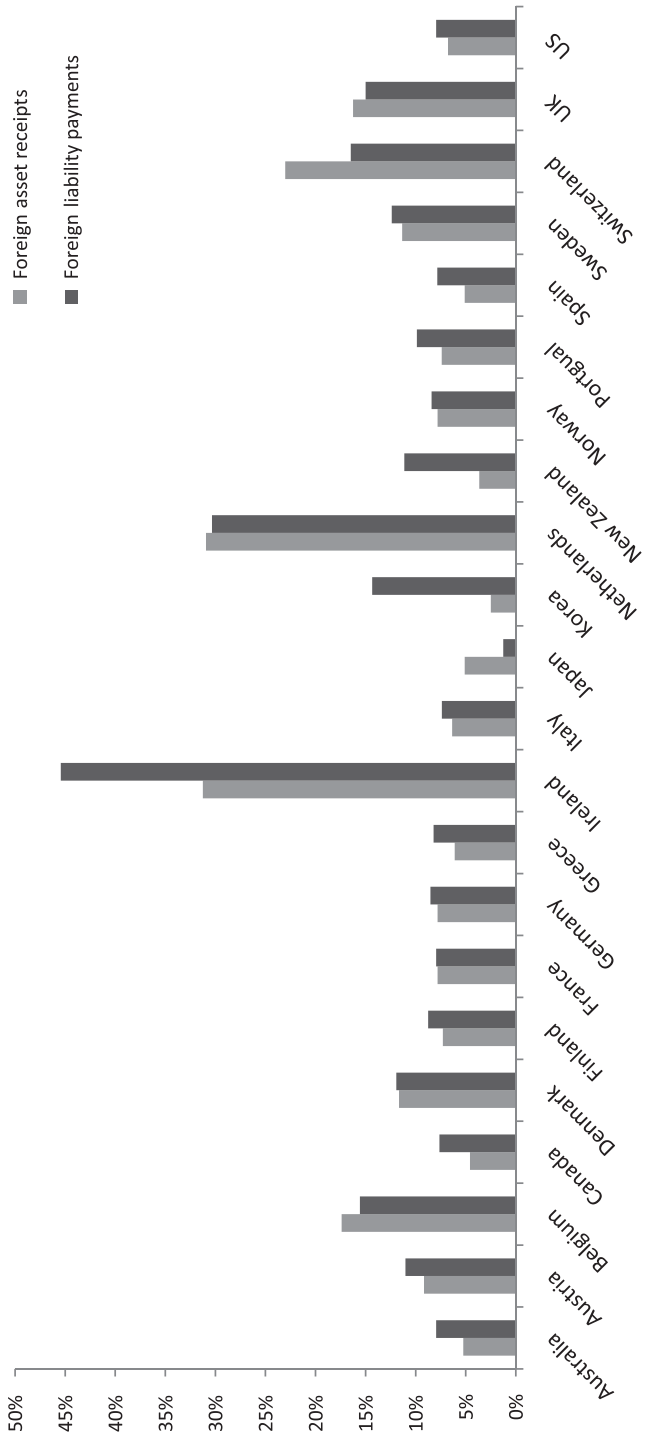

Figure 2 Foreign asset receipts to GDP and foreign liability payments to GDP ratios for OECD markets.
Source: OECD Detailed National Accounts Database, and authors' own calculations. Both foreign asset receipts to GDP and foreign liability payments to GDP ratios are averaged for years between 1970 and 2007.

FOREIGN LIABILITY PAYMENTS/GDP than *FOREIGN ASSET RECEIPTS/GDP* ratios. This is consistent with the pervious studies including Sørensen and Yosha (1998), indicating that the developed countries are mostly creditors and pay more than they receive from financial assets abroad. Among the OECD countries, Ireland's ratios (both *FOREIGN ASSET RECEIPTS/GDP* and *FOREIGN LIABILITY PAYMENTS/GDP*) are the highest (above 30%), followed by the Netherlands (around 20%). This finding is by no means a surprise given that the degree of financial openness is highest in these countries. The *NET COMP. OF EMPLOYEE/GDP* ratio is 3.86% for emerging markets on average, contrasting with 0.35% for OECD markets. Understandably, this result stems from the fact that emerging countries rely more on income transfers from nationals living abroad than do the OECD countries that are hosts for migrants from the rest of the world. Figure 3 presents the *NET COMP. OF EMPLOYEE/GDP* ratio for the emerging countries. The ratio is highest for the Philippines, which according to the OECD Outlook Database, has more than 2 million of their citizens residing in the oil-riched Gulf Arab countries, and regularly sending money transfers back home. These transfers are counted as net compensation of employees from abroad. Likewise, the ratios are above average for the Middle Eastern and North African (MENA) countries, since their citizens mostly work as temporary workers across oil-riched Gulf Arab countries. Central and Eastern European (CEE) countries also benefit from compensation of employees from abroad as they have over average *NET COMP. OF EMPLOYEE/GDP* ratios. After the CEE countries became members of the European Union (EU), natives of these countries have been able to work in western EU countries, especially in Sweden, Ireland, and the UK, which might be considered as the reason why we observe higher *NET COMP. OF EMPLOYEE/GDP* ratios for CEE.

A. Income insurance channel for OECD members

In Table 2, we present the decomposition of the net factor income flows channel for OECD countries to determine whether any of the subchannels of income smoothing is statistically significant. Particularly, we document whether subchannels other than the net financial asset revenues are solid subchannels for income smoothing. Table 2 contains the estimated regression coefficients for equations (5) to (7). These estimates indicate that neither net compensation of employees from abroad nor net tax on imports are significant subchannels of income insurance over different subsamples. The coefficient estimates of equation (5) show that income smoothing via net foreign asset revenues is positive and statistically significant for OECD and its subsamples of the European Monetary Union (EMU) and EU, and non-EU OECD.[14] In

14 EMU includes Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, and Spain. EU sample is made up of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, and the UK. The non-EU OECD is made up of Australia, Canada, Japan, Korea, New Zealand, Norway, Switzerland, and the United States.

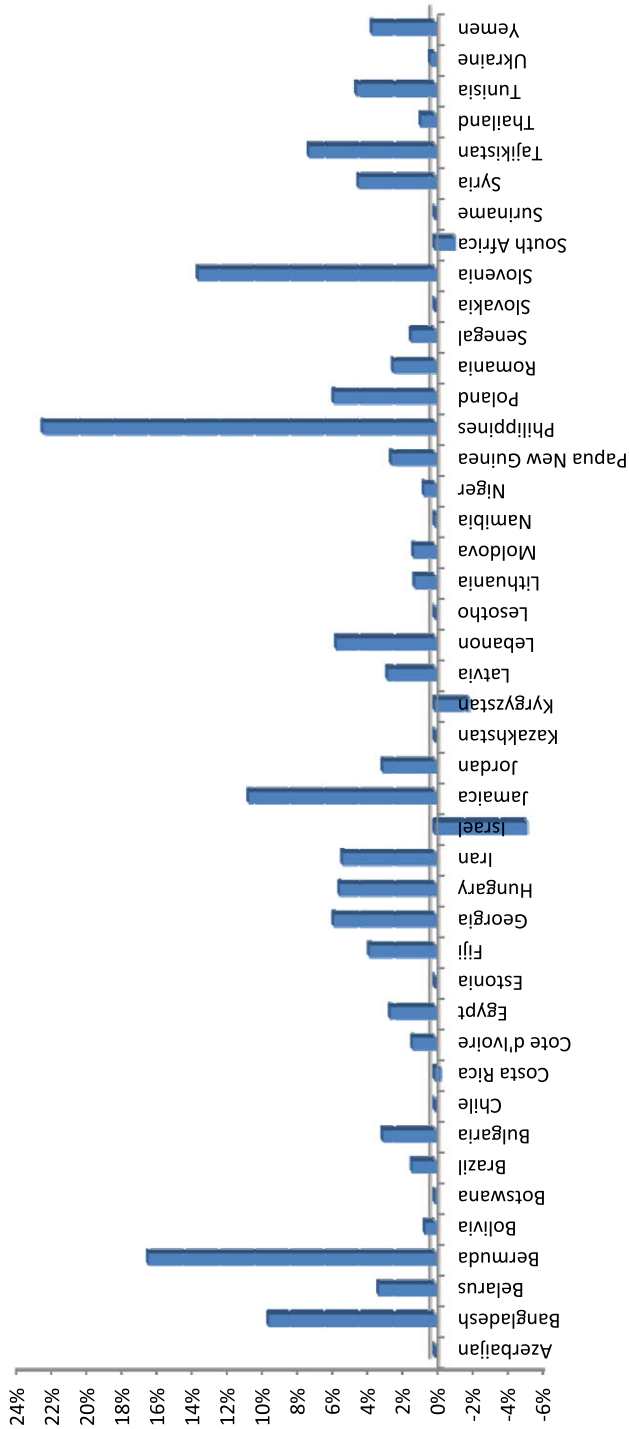

Figure 3 Net compensation of employees from rest of the world to GDP ratio.
Source: UN Detailed National Accounts Database, and authors' own calculations. The net compensation of employees from the rest of the world to GDP ratios are averaged for the period between 1970 and 2007.

Table 2 Decomposition of international income smoothing via components of net factor income channel (percent): 1995–2007

	EMU	EU	Non-EU OECD
NET FOR. ASSET INCOME $(1-\beta_{fa})$	9 (2)	8 (4)	8 (3)
NET COMP. OF EMPLOYEE $(1-\beta_c)$	0 (1)	−1 (1)	0 (0)
NET TAX ON IMPORT $(1-\beta_\tau)$	0 (1)	0 (1)	0 (1)

Notes: EMU: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, and Spain. EU: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, and the UK. Non-EU OECD: Australia, Canada, Japan, Korea, New Zealand, Norway, Switzerland, and the United States.
Percentages describe the shocks absorbed at each level of smoothing. Heteroscedaticity and autocorrelation consistent (HAC) standard errors are shown in brackets. The percentage of income smoothing from net compensation of employee channel is $(1-\beta_c)$, where β_c is the GLS estimate of the slope in the regression of $\Delta\log(GDP + \widetilde{NET\ COMP.\ OF\ EMPLOYEE})_t^i$ on $\Delta\log\widetilde{GDP_t^i}$. The percentage of income smoothing from the net tax on imports channel is $(1-\beta_\tau)$, where β_τ is the GLS estimate of the slope in the regression of $\Delta\log(GDP + \widetilde{NET\ TAX\ ON\ IMPORT})_t^i$ on $\Delta\log\widetilde{GDP_t^i}$. The percentage of income smoothing from net revenue from financial assets is $(1-\beta_{fa})$, where β_{fa} is the GLS estimate of the slope in the regression of $\Delta\log(GDP + \widetilde{NET\ FOR.\ ASSET\ INCOME})_t^i$ on $\Delta\log\widetilde{GDP_t^i}$.

summary, Table 2 shows that income smoothing via the net factor income channel is driven by net income flows arising from net foreign asset holdings.

Table 3 contains the income smoothing results that are produced by the decomposition of net factor income flows into factor income inflows and factor income outflows for the OECD subsamples described above. The top panel contains the results for the EMU members. Overall, income smoothing via net factor income $(1-\beta_f)$, shown in the top-most row of estimates, has increased over the years from 0% in the 1970s and 1980s to 4% in the 1990s and 8% after the formation of the EMU in 1999. The middle panel shows that dis-smoothing took place in the 1980s for the EU group; other than that, the results are similar. In the bottom panel, for the non-EU OECD members, the results are also similar, though overall income smoothing via net factor income is not statistically significant after the 2000s.

In each panel, the second row contains the estimated coefficients for income insurance via the factor income inflows channel $(1-\beta_f^+)$. For the EU and EMU samples, income smoothing via factor inflows is not significant and/or evidence of dis-smoothing is present. These findings therefore suggest that factor income inflows most probably co-move with or are oversensitive to domestic output shocks. Two factors may be at the origin of the income dis-smoothing observed: the home bias phenomenon and the synchronization of European business cycles resulting from full economic integration. As documented in the literature, EU investors tend to hold a sizable portion of their portfolio within the EU region. These results accord with those of Demyank et al.'s (2008), which stated that Euro portfolio bias restricts income smoothing via factor income flows within the EU area. A closer look at the non-EU OECD sample in recent years

Table 3 Decomposition of income insurance channel via net factor inflows (percent): factor income inflows and factor income outflows

	1971–1980	1981–1990	1991–2000	2001–2007
		Panel A: EMU		
$(1-\beta_f)$	0 (1)	0 (3)	4 (3)	8 (2)
$(1-\beta_f^+)$	4 (2)	1 (3)	−10 (3)	−9 (6)
$(1-\beta_f^-)$	−3 (1)	−2 (1)	14 (7)	18 (8)
		Panel B: EU		
$(1-\beta_f)$	0 (1)	−2 (2)	0 (3)	7 (4)
$(1-\beta_f^+)$	3 (1)	4 (2)	−12 (3)	−6 (7)
$(1-\beta_f^-)$	−3 (1)	−7 (3)	14 (6)	16 (10)
		Panel C: Non-EU OECD		
$(1-\beta_f)$	−1 (1)	−3 (1)	0 (3)	5 (3)
$(1-\beta_f^+)$	−1 (1)	1 (4)	−2 (7)	4 (3)
$(1-\beta_f^-)$	0 (1)	−4 (3)	2 (2)	3 (1)

Notes: EMU: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, and Spain. EU: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, and the UK. Non-EU OECD: Australia, Canada, Japan, Korea, New Zealand, Norway, Switzerland, and the United States. Percentages describe the shocks absorbed at each level of smoothing. HAC standard errors are shown in brackets. $(1-\beta_f)$ is the amount of income smoothing via the net factor income flow channel and the coefficient β_f is the GLS estimate of the slope in the regression of $\Delta\log\widetilde{GNI}_t^i$ on $\Delta\log\widetilde{GDP}_t^i$. $(1-\beta_f^+)$ is the amount of income smoothing via factor income inflow channel where β_f^+ is the GLS estimate of the slope in the regression of $\Delta\log(GDP+\widetilde{FACTOR\ INCOME\ INFLOW})_t^i$ on $\Delta\log\widetilde{GDP}_t^i$. $(1-\beta_f^-)$ is the amount of income smoothing via the factor income outflow channel, and the coefficient β_f^- is the GLS estimate of the slope in the regression of $\Delta\log(GDP-\widetilde{FACTOR\ INCOME\ OUTFLOW})_t^i$ on $\Delta\log\widetilde{GDP}_t^i$.

shows that the extent of income smoothing via factor inflows has become positive, contrasting with EU and EMU samples, though this is not statistically significant.

The last row of each panel contains the estimates for income insurance via factor income outflows $(1-\beta_f^-)$. For each subsample, smoothing via outflows is significant and positive; it is 18% for the EMU, 16% for EU, and 3% for non-EU OECD after 2000. The underlying explanation for this result is that income factor outflows (financial liability payments) and output shocks are procyclical in nature. Higher (lower) economic growth produces, on average, higher (lower) profits for firms, which can be translated into higher (lower) dividends and payments of foreign liabilities. For EU countries in particular, the rise in financial liabilities over recent years may have triggered the increased income smoothing via factor income outflows. We test this hypothesis and present the results in Table 4.

B. Country-by-country estimates

In the country-by-country analysis, we are able to compare the subchannel performances for OECD and emerging markets samples. Accordingly, we use the

Table 4 Country-by-country estimates of income insurance via foreign asset receipts and foreign liability payments for OECD sample

Country	$(1-\beta_{fa}^{+})$	$(1-\beta_{fa}^{-})$
Australia	3*	–4
Austria	–3	6**
Belgium	–10**	16***
Canada	2	6**
Denmark	–2	10***
Finland	–1	4*
France	–3	3*
Germany	2	5**
Greece	4**	–4
Ireland	–14***	35***
Italy	0	4**
Japan	4*	6*
Korea	3	14**
Netherlands	–14***	34***
New Zealand	–1	1
Norway	3	3
Portugal	–4	–2
Spain	–3	6**
Sweden	–3	10***
Switzerland	–1	31***
UK	1	4*
United States	2	3

Notes: The period is between 1970 and 2007. Percentages describe the shocks absorbed at each level of smoothing. $(1-\beta_{fa}^{+})$ is the amount of income insurance via foreign asset receipts where β_{fa}^{+} is the country-by-country OLS estimate of the slope in the regression of $\Delta\log(GDP+\widetilde{FOREIGN\ ASSET\ RECEIPTS})_t^i$ on $\Delta\log\widetilde{GDP}_t$ for each country. $(1-\beta_{fa}^{-})$ is the amount of income insurance via foreign liability payments, and the coefficient β_{fa}^{-} is the country-by-country OLS estimate of the slope in the regression of $\Delta\log(GDP-\widetilde{FOREIGN\ LIABILITY\ PAYMENTS})_t^i$ on $\Delta\log\widetilde{GDP}_t$ for each country. *, **, and *** indicate that the relevant coefficient is significant at the 10%, 5%, and 1% level, respectively.

decompositions in equations (9) and (10) in the following three tables. Table 4 shows the results associated with the decomposition of income insurance via foreign asset receipts $(1-\beta_{fa}^{+})$ and liability payments $(1-\beta_{fa}^{-})$ channels for each country in the OECD sample. The findings are similar to Table 3 and indicate that foreign asset receipts dis-smooth income while foreign liability payments plays a leading role in smoothing income for OECD members. As discussed earlier, EU portfolio bias and increased business cycle synchronization in Europe are the two most plausible explanations of this result. Regarding the former, Demyank et al. (2008) show that EU countries allocated between 50–70% of their foreign equity portfolio and between 60–80% of their foreign bond portfolios within the EU region. The latter has been documented in a number of recent studies, e.g., Darvas and Szapary (2008), Inklaara et al. (2008),

Furceri and Karras (2008), Savva et al. (2010).[15] We also observe that for countries such as Belgium, Ireland, and the Netherlands, which are financially more open, the magnitude of income insurance via foreign liability payments is higher, and the dis-smoothing via foreign asset receipts is also higher. For the non-EU OECD sample, the driving force of income insurance is foreign liability payments, though foreign asset receipts provide a little coverage.

The estimates for equations (9) and (10) are presented in Table 5 for emerging markets individually. Unlike the OECD countries, in Table 4, overall, emerging markets do not experience income smoothing from either foreign asset receipts or foreign liability payments. Apart from Botswana, Israel, Kuwait, Lebanon, and Saudi Arabia, foreign asset receipts are not able to smooth output shocks for emerging markets. Interestingly, these five countries have the highest ratio of foreign asset receipts to GDPs as indicated in Figure 2. This finding is consistent with Sørensen et al.'s (2007) that higher volume of foreign asset holdings leads to an increase in the scope of income insurance. Basically, we may conclude that we are able to show a positive relationship between the volume of foreign asset holdings and the amount of income insurance for emerging markets. In further contrast to OECD countries, most emerging markets do not benefit from income insurance via foreign liability payments. A comparison of Table 1 with Figures 1 and 2 shows that foreign liability payments to GDP ratios are high in emerging markets compared to foreign asset receipts to GDP ratios – almost similar to the OECD counterparts – but these payments are more volatile, fluctuating with the changes in the domestic asset returns of these markets compared to the OECD counterparts. This might be the reason why the liability payments is not a strong subchannel for income insurance for emerging markets. Among emerging markets, only CEE and Asia markets experience – to some extent – income insurance via foreign liability payments.

Table 5 summarizes that neither foreign asset revenues nor financial liability payments are drivers of income insurance in emerging markets. This may be due to capital flows restrictions and/or because the volumes of capital inflows/outflows and receipts/payments are far beyond those of the OECD members. However, the short-term labor exports of emerging markets create important sources of inflows. Looking at Figure 3 and Table 1, the compensation of employees from abroad to GDP ratio is, on average, around 4% for emerging markets, ranging from 25% for the Philippines to –5% for Israel.[16] A closer look

15 Darvas and Szapary (2008) examine the synchronization of business cycles between new and old EU members, and provide evidence of substantially stronger cyclical correlations within the EU area. Inklaara et al. (2008) studied the business cycles across OECD countries and find an increase in synchronization between non-EU OECD countries and the European countries. Furceri and Karras (2008) show that all countries in our EU sample are now more synchronized with the EMU-wide economy in the post-EMU era than they were before the start of the EMU. Lastly, Savva et al. (2010) find that all EU members experience an increase in business cycle synchronization with the EMU region.

16 The short-term labor inflows to Israel from other emerging markets (in particular, the Palestinians) is the main reason why Israel had a large and negative amount of compensation of employees from abroad.

Table 5 Country-by-country estimates of income insurance via foreign asset receipts and foreign liability payments for emerging markets sample

Country	$(1-\beta^{+}_{fa})$	$(1-\beta^{-}_{fa})$	Country	$(1-\beta^{+}_{fa})$	$(1-\beta^{-}_{fa})$
Asia			Latin America		
Azerbaijan	0	5*	Bahamas	–8*	14**
Georgia	0	–1	Bolivia	0	2
Kazakhstan	–1	5*	Brazil	0	0
Kyrgyzstan	0	0	Bulgaria	0	–1
Nepal	1	1	Colombia	0	–1
Sri Lanka	–1	–	Costa Rica	–1	4*
Philippines	–1	–3	Guatemala	–1	0
Thailand	0	1	Jamaica	–1	1
Middle East and North Africa			Nicaragua	–1	–7
			Panama	–1	8**
Egypt	–1	–8*	Trinidad and Tobago	0	2
Iran	–1	0	Uruguay	–1	–3
Israel	5*	2*	Central and Eastern Europe		
Jordan	0	–8**	Estonia	–4	16***
Kuwait	5**	–4	Lithuania	0	6*
Lebanon	8**	–1	Latvia	0	0
Morocco	0	–2	Moldova	0	0
Saudi Arabia	6*	–9	Romania	–1	3
Syria	–2	–6*	Russian Federation	–1	–8*
Tunisia	0	–3	Slovakia	0	–1
Yemen	–1	–3	Slovenia	–5	9**
Sub-Saharan Africa			Ukraine	–1	–2
Botswana	17***	–2			
Kenya	–1	–2			
Lesotho	3	3			
Mauritius	–4*	–1			
Namibia	1	1			
Niger	0	–1			
Nigeria	0	–1			
Senegal	–1	–2			
South Africa	0	–3			
Tanzania	0	–3			

Notes: The period is between 1970 and 2007. Percentages describe the shocks absorbed at each level of smoothing. $(1-\beta^{+}_{fa})$ is the amount of income insurance via foreign asset receipts where β^{+}_{fa}, is the country-by-country OLS estimate of the slope in the regression of $\Delta\log(GDP + \widetilde{FOREIGN\ ASSET\ RECEIPTS})^{i}_{t}$ on $\Delta\log\widetilde{GDP}_{t}$ for each country. $(1-\beta^{-}_{fa})$ is the amount of income insurance via foreign liability payments, and the coefficient β^{-}_{fa} is the country-by-country OLS estimate of the slope in the regression of $\Delta\log(GDP - \widetilde{FOREIGN\ LIABILITY\ PAYMENTS})^{i}_{t}$ on $\Delta\log\widetilde{GDP}_{t}$ for each country. *, **, and *** indicate that the relevant coefficient is significant at the 10%, 5%, and 1% level, respectively.

at Table 6, which contains the results of equation (6) for emerging markets, indicates that these results are mixed in terms of smoothing. We observe a positive connection between the amount of net compensation of employees from abroad and income insurance for only some of the emerging markets. For

Table 6 Country-by-country estimates of income insurance via compensation of employees from the rest of the world for emerging markets sample

Country	$(1-\beta_c)$	Country	$(1-\beta_c)$
Asia		Latin America	
Azerbaijan	3*	Bermuda	14***
Bangladesh	8**	Bolivia	–1
Bhutan	–8*	Brazil	3*
Georgia	4*	Chile	2
Kazakhstan	5*	Costa Rica	–1
Kyrgyzstan	3*	Jamaica	5**
Tajikistan	12***	Suriname	0
Central and Eastern Europe		Sub-Saharan Africa	
Belarus	0	Botswana	–2
Bulgaria	–8*	Cote d'Ivoire	–1
Estonia	–1	Lesotho	0
Hungary	1	Namibia	1
Latvia	0	Niger	2
Lithuania	0	Senegal	9**
Moldova	–1	South Africa	0
Poland	9**	Oceania and East Asia	
Romania	0	Fiji	3*
Slovakia	0	Papua New Guinea	3*
Slovenia	4*	Philippines	7**
Ukraine	–1	Thailand	–5
Middle East and North Africa			
Egypt	–4*		
Iran	–11**		
Israel	–7**		
Jordan	–5*		
Lebanon	–13***		
Syrian Arab Republic	–11***		
Tunisia	–2		
Yemen	–1		

Notes: The period is between 1970 and 2007. Percentages describe the shocks absorbed at each level of smoothing. $(1-\beta_c)$ is the amount of income insurance via net compensation of employees from abroad where β_c is the country-by-country OLS estimate of the slope in the regression of $\Delta \log(GDP + NET\ \widetilde{COMP.\ OF}\ EMPLOYEE)_t^i$ on $\Delta \log \widetilde{GDP}_t$ for each country. *, **, and *** indicate that the relevant coefficient is significant at the 10%, 5%, and 1% level, respectively.

countries with higher net compensation of employees from abroad to GDP ratios, such as Bangladesh, Bermuda, the Philippines, Poland, and Tajikistan, the effect on income insurance is positive, significant, and large in magnitude. For the Middle East, although the amount of the compensation of employees from abroad to GDP is relatively high (Jordan, 4%; Iran, 5%; Syrian, 5%; Tunisia, 5%; Lebanon, 6%), the data shows that income dis-smoothing via net compensation of employees instead takes place for these countries. We conjecture that since the oil-rich Gulf Cooperation Council (GCC) countries are the most

important and closest destinations for the non-GCC MENA workers, transfer payments might be wrongly classified as compensation. Also, since the business cycles of MENA and GCC countries are synchronized, compensation of employees from abroad produces no income smoothing or even produces dis-smoothing. Taking a closer look at the Philippines with over 2 million of emigrants residing in the GCC, transfer payments of these workers to home, though erroneously might be counted as compensation. Weak business cycle synchronization of Philippines with the GCC region is the main reason why we recorded income smoothing of 7% of total per capita income at the 5% significance level. This figure stands at 8% for Bangladesh, which falls in the same category as the Philippines. These payments may erroneously be recorded as 'compensation of workers from abroad' but serve to synchronize the business cycles of the Philippines and the GCC, albeit weakly. Bangladesh, which has a similar pattern of emigrant workers, records income smoothing of 8% of total per capita income.

V. CONCLUSION

In this paper, we decompose the channel of income insurance via net factor income flows for the OECD and emerging markets. We document that income insurance is mostly driven by the factor income outflow (foreign liability payment) channel rather than the factor income inflow (foreign asset receipt) for OECD members. We find that for EU members, in particular, there is no sign of a positive relationship between the amount of foreign asset holdings and factor income smoothing. We indicate that the tendency of EU investors to allocate large chunks of foreign asset holdings within the EU region and the increasing synchronization of EU economies lead to procyclical movements between foreign asset revenues and domestic output shocks, which limit income smoothing. In decomposing the net factor income channel for emerging markets, we show that neither foreign liability payments nor foreign asset receipts are strong channels of income smoothing. Instead, the net compensation of employees from the rest of the world plays that important role, but the results are, by and large, mixed. Some countries experience substantial income smoothing via this channel while others experience income dis-smoothing.

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