Chapter 5
Capital Flows and Income Distribution

The analysis so far has shown how global liquidity—boosted by easy money policy in advanced economies—has affected emerging markets, particularly in Asia. The focus has been on the implications on financial and macroeconomic stability and on the behavior of economic agents. It has also pointed to the limited effectiveness of standard monetary policy and the need for developing new early warning indicators. From the development perspective, it is also of interest to find out how changing global liquidity and capital flows may affect socioeconomic issues such as income inequality, unemployment, and poverty. In this chapter, we show in particular how capital inflows to emerging Asia can also change these indicators.

Using a general equilibrium framework with a financial module, we show the mechanism for how seemingly unrelated financial phenomena are in fact closely interlinked with income inequality, unemployment, and poverty. We argue that while helping boost economic growth, capital inflow surges can create not only financial instability, but also worsen conditions in terms of these socioeconomic indicators. More particularly, in the case of increased bank-led flows, the impact critically depends on whether or not recipient banks take on more risk. By combining model-based results applied to a particular case in one Asian economy—where massive capital inflows came in response to easy money and low interest rates in advanced economies, and where income disparity is rising—we show that when banks become more risky, the impact of increased bank-led flows on growth, macroeconomic aggregates, household income distribution, unemployment, and poverty are not favorable.

With these results, we then discuss measures that could help prevent banks from taking on excessive risk. Using a theory-based ranking and by considering the benefits, opportunities, costs, and risks of alternative criteria and policies, we find that imposing a macroprudential levy on bank-led flows, the same tool we proposed in a previous chapter, can indeed produce more favorable results. Furthermore, taking into account several criteria and factors, we argue that this policy works not only for macroeconomic and micro-cum-financial stability, but

I.J. Azis and H.S. Shin, *Managing Elevated Risk*,
DOI 10.1007/978-981-287-284-5_5

also for socioeconomic objective. This reinforces the argument why a "second best" approach to liberalization is better than the "first best" approach. Despite the need for cooperation and policy coordination among countries, national policy should remain key when it comes to maintaining macrofinancial stability and improving socioeconomic conditions.

5.1 National Policy Remains Key

Although capital flows derive from push and pull factors—and hence should be ideally handled through policy cooperation and coordination among economies—in reality, policy makers in individual economies are forced to take unilateral policies. In most cases, regional and international policy coordination works only in theory. Indeed, even as economies become more interdependent, national policies continue to rule irrespective of spillovers to other economies and the talk of policy coordination and cooperation. The ultraeasy money policy in advanced economies discussed in Chaps. 2 and 4 is a recent example of this "financial nationalism." It had significant repercussions on global liquidity by generating massive capital flows. Despite the risks and potential damage capital flows can cause to other economies, no one can stop them—especially when the spread of returns (interest rates) is large and the growth differential between advanced and emerging markets is substantial. In effect, emerging markets at the receiving end ought to deal with the risks through unilateral national policies.

If capital inflows cause instability and eventually lead to a crisis, more often than not the socioeconomic repercussions are disastrous. In dealing with this, no global or regional policy initiative can substitute for good national policies. Indeed, the evidence where a standard policy response damages welfare is widespread—especially when governments are belt-tightening. For example, on 17 May 2012, a joint statement by the Director General of the International Labour Organization (ILO) and Secretary General of the Organisation for Economic Co-operation and Development (OECD) said that some 20 million jobs in both developed and developing economies had disappeared since the onset of the 2008/2009 global financial crisis, and 21 million jobs must be generated in G20 economies just to match the precrisis employment rate—impossible to achieve in the near term. If anything, the risk is the unemployment rate could increase. A crippled crisis-affected financial sector is bad enough; but nothing is worse than if the true costs are in terms of employment and the welfare of most people.[1]

The national policy most relevant to the phenomenon of capital flows is financial sector liberalization, where capital openness is a central component. Financial liberalization has been widely promoted as a way to better allocate capital and widen opportunities for savers and investors. It creates an environment

[1] For example, the environmental impact of a contagion-driven crisis poses another serious welfare risk. While a crisis can reduce pollution and resource consumption through reduced economic activity, a weakened economy also tends to lower environmental priorities.

conducive to financial innovation. Some argue that it also helps build discipline among policy makers in securing macroeconomic stability. This has been the predominant thinking for several decades.

One of the most important components—if controversial—of financial sector liberalization is capital account liberalization. Capital flows resulting from capital account liberalization are channeled through domestic intermediaries—either banks or firms—allowing greater competition and thus more efficiency. Countries freeing up their capital accounts often see a sudden jump in economic growth as they move away from financial repression. Yet, many of them, developing and developed economies alike, subsequently face instability, with some eventually suffering financial crisis.[2]

When confronted with this, defenders of capital account liberalization often cite the lack of preconditions before liberalizing to explain why crises emerge. They blame institutional factors like corruption, weak enforcement, and limited understanding on how a liberalized financial sector operates. Policy recommendations thus center on fixing those institutional factors; they never question the virtue of capital account liberalization itself. But the shocks that hit the US beginning in 2007 and the later Eurozone crisis are counterevidence that this is based on an erroneous hypothesis. The institutional quality in the US and Europe are supposedly better than most emerging market economies, yet they could not escape from crisis.

Only recently have analysts and scholars admitted that early preaching on financial sector liberalization and capital account liberalization was flawed (CIEPR 2012). They now admit that the "first best" approach of financial liberalization—where frictionless outcomes are emphasized—is faulty and should be replaced by a "second best" approach in which financial regulation is given far greater importance, and where capital controls are no longer taboo. After decades of preaching the virtues of cross-border capital flows, the International Monetary Fund (IMF) finally admitted that some restrictions on capital flows can help protect an economy from financial turmoil. Central to the analysis is the need to maintain financial stability and macroprudential policy (IMF 2012).

Thus, despite the role of push and pull factors in capital flows, in reality, individual economies use unilateral national policies. Capital-sending countries do whatever is needed (financial nationalism) regardless of spillover effects on other countries. Affected countries also take whatever national policy is necessary to assuage the impact. While it provides the rationale for policy coordination, in reality, there is no effective coordination. Although this is nothing new and should not seem unusual, the problem becomes serious when a unilateral policy is taken by the world's largest economy, because its policy repercussions will easily spread globally through massive capital flows and alter the landscape of global liquidity. The resulting exchange rate pressure in emerging markets forced frequent market

[2] In the 1990s alone, financial crises hit Europe (1992/1993), Mexico/Latin America (1994), Asia (1997), Eastern Europe and the Russian Federation (1998). Crisis contagion has also become more global and less regional, as evidenced by the recent global financial crisis. New technology and better information enable financial spillovers by reducing structural distance.

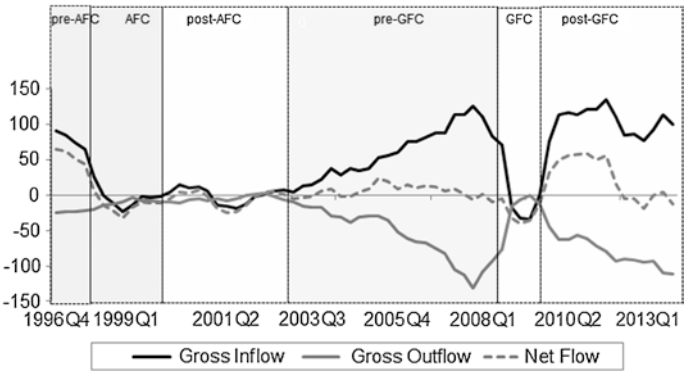


Fig. 5.1 Capital inflows and outflows—selected Asian economies. *AFC* Asian financial crisis; *GFC* global financial crisis. *Note* Data include Indonesia, the Republic of Korea, the Philippines, and Thailand; based on a 4-quarter moving sum, inflows refers to bank flows from other investments in liabilities (assigned a positive value); outflows are from assets (assigned a negative value). *Source* Processed from *Balance of Payments Statistics* (*both BPM5 and BPM6*), International Monetary Fund

intervention to maintain trade competitiveness. Policy makers in emerging markets also struggle to minimize the risk of financial instability. As additional funds flow in, economic agents take on more risks. Banks are more willing to invest in risky financial assets when bank-led flows increase. They are also more willing to lend because currency appreciation bolsters borrower balance sheets.

The problem arises when changes in investor sentiment or other external shocks cause asset prices to fall and capital flows to reverse. Bank balance sheets will be adversely affected, loans disrupted, and the economy can suffer from a credit crunch. Some of these were faced by several Asian economies when European banks deleveraged and retrenched funds to strengthen their capital position.[3] The elevated risks in Asia stem from very large amounts of capital flows coming into the region, as discussed in Chaps. 2 and 4. The discussions point to one common feature: the size and volatility of these flows have increased since the global crisis, more than what preceded the 1997/1998 Asian financial crisis (Fig. 5.1). As also discussed in Chap. 2, among the four types of capital flows, debt- and bank-led flows are the most volatile. This poses challenges for financial stability. We discuss how this affects welfare next—particularly the income distribution among different households in recipient economies.

[3] In the Republic of Korea, each 1 % decline in external funding due to European bank deleveraging led to a 0.01 % decline in domestic credit by domestic banks (Jain-Chandra et al. 2013). This occurred despite the economy's relatively healthy foreign reserves, government efforts to provide foreign currency liquidity through bilateral and multilateral currency swap arrangements, and macroprudential measures that lowered domestic bank reliance on short-term wholesale funding.

5.2 How Capital Flows Affect Income Inequality

To understand better how capital inflows can worsen socioeconomic conditions, we need to have a clear conception on how the impact is transmitted, and under what conditions inflows will trigger the process. Only then, appropriate policies can be identified.[4]

Figure 5.2 depicts the link between financial development, product and factor market, trade, and household income. It is a summarized flowchart explaining the transmission mechanism from increased capital flows in the financial market block to rising unemployment in the product and factor market block, and worsening income inequality and poverty in the household income block.[5] The middle part of the flowchart represents the dynamics in goods and factor markets (real sector)—including trade (exports and imports)—while the left side captures the workings of financial markets. The interconnection between the two determines the resulting unemployment and the generated household incomes in the income block (right part of the flowchart). Considering the endogenous prices, the poverty line can also be derived endogenously. The nature of the link between financial sector and real sector will thus influence income inequality and poverty. But the interrelations among variables are complex and nonlinear.

The characteristics of the interrelations among blocks and variables are similar to those often captured in a computable general equilibrium (CGE) model. To further describe the flowchart in Fig. 5.2, the real sector establishes the income generation from **output** production, with a portion covering the **domestic market** and **exports**. Together with **imports**, those sold in the domestic market generate the total **supply of goods and services**. In both allocations, the substitution is imperfect (not costless).[6] The process that generates **output** production follows a standard input–output framework, where **value added** and **intermediate inputs** jointly determine the level of **output** production. Expanding production networks and supply chains—where the location of production is different from the economy where the intermediate inputs are produced—suggests the need to distinguish between **imported intermediate inputs** and **domestically produced intermediate inputs**. This distinction is important particularly for trade analysis in many emerging market economies where the import content of many export products is large. The dynamics of the use of imported inputs to produce exported goods, known as vertical specialization, reflects a new paradigm in the overall global production network, which has increased dramatically since the 1980s, especially in high-tech products

[4] The analysis in this section is largely taken from Azis (2014).

[5] Not shown in the figure are prices of quantity variables, the role of which is critical in determining, among others, the endogenous poverty line.

[6] In a standard CGE model, for example, the allocation between the domestic market and imports follows Armington's constant elasticity of substitution, while the allocation between domestic market and exports follows a constant elasticity of transformation.

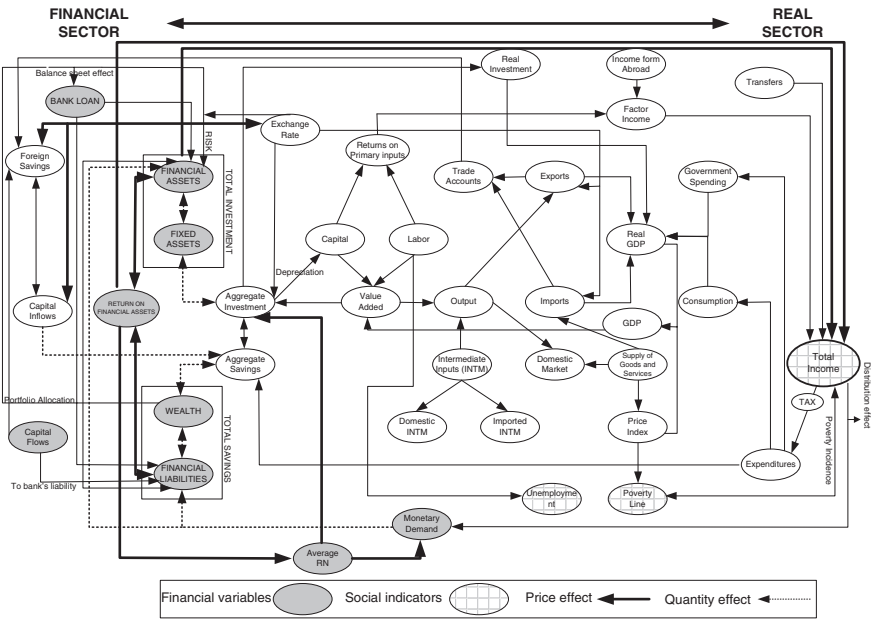


Fig. 5.2 Flowchart connecting real financial sector and income distribution. *Source* Modified from Azis (2014)

in emerging Asia (Hummels et al. 2001; Amador and Cabral 2009). It represents an important element of international trade.

To focus on the household incomes, we scrutinize the sources of income generation, both for primary and nonprimary incomes. The primary income is derived from the **value added**, the **returns on primary inputs** of **labor,** and **capital**. In turn, these **returns** generate **factor incomes** including **income from abroad**. However, **total income** consists of more than just factor income; it also includes transfers between agents/institutions. **Tax** payments that subtract and subsidies that add income are examples of these transfers, where size depends on the prevailing fiscal policy. Thus, income of different agents, including households, is influenced by both the level of economic activity and this nonfactor income.[7] The way subsidies are allocated can have significant impact on actual household income; typically, most subsidies go to low-income households.

But to capture the main essence of how capital flows affect household income distribution, we need to identify the income generation that originates in the financial sector. This is important because in reality the actual income received by the rich and urban-based households holding financial assets can be well above income accrued

[7] The effect of income level on macro variables works through the expenditure side. Together with government expenditure and net exports, real consumption reflects the size of agents' expenditure out of their disposable income. The latter is determined by income level.

by those who do not hold financial assets. Thus, even if factor incomes and transfers tend to be more equalized, earnings from these financial assets can worsen overall income inequality.

In a liberalized financial and capital account environment, rich urban-based households are better able to reap benefits from an expanding financial sector. During the "bubble" period following a surge in **capital inflows**, they benefit from the increased value of their **financial assets** as well as the income stream generated from those assets, regardless of what happens in the real economy. In many cases, this portion is larger than that generated from factor income. To the extent the financial sector often grows much faster than the real sector during a boom, the impact on income distribution can be predicted—the rich earn far more than the poor, and urban household income grows faster than rural income. Both of these exacerbate income inequality.

The increase in bank-led flows discussed in Chaps. 2 and 4 is first charted in **capital flows** at the bottom left of Fig. 5.2. Together with **bank loans**, these flows directly augment banks' **financial liabilities**.[8] This alters the rate of **return on financial assets** and financial returns received by asset holders (financial returns and income are linked). Financial assets also have a two-way relationship with the size and composition of different agents' assets. **Fixed assets** will be used directly for real sector **investment**, such as in buildings, machinery, and the like, while the rest—including **financial assets**—may move indirectly via financial markets; for example, funds from equity issuance are used for business investment. Along with **government spending**, **consumption** expenditure, **exports**, and **imports**, this **real investment** generates **real gross domestic product** (GDP).[9]

When there is an increase in **capital flows**, also captured by increased **foreign savings**, the **exchange rate** tends to appreciate. This is on top of the macrofinancial impact of the flows. The resulting **trade account** may thus worsen due to falling **exports** and increased **imports**. In reality, however, almost all emerging market economies with large capital inflows respond by imposing some sort of capital controls—either directly (through taxes or levies, for example) or indirectly (sterilized market intervention). This explains why net exports in some countries continue to grow despite increased capital inflows. When net exports shrink, the growth of **consumption** and **investment** can also offset the decline.

The resulting higher **real gross domestic product** fuels further financial sector growth either from strong fundamentals or simply market expectations. This further enhances rich household income along with **savings** or **wealth**, providing them with an additional income stream from financial returns. Note that changes in the exchange rate also cause some valuation effects: The local currency value of any assets denominated in foreign currencies will increase (decrease) when local currency appreciates (depreciates). If, through the portfolio allocation, the increased wealth is reinvested in financial instruments with lucrative returns, the

[8] As discussed in Chap. 4, lending is not only determined by the size of a bank's available funds, but also by changes in net worth and external finance premiums of both borrowers and lenders.

[9] Other financial variables can also affect aggregate economic activity through the money market.

financial assets and earnings of rich households increase yet again. This magnitude of the growth–inequality nexus is amplified through this feedback cycle.[10]

Thus, through this mechanism, we strongly argue that—in addition to standard factors like technology, globalization, education, and domestic institutions—the trend of rising inequality can be exacerbated by the noninclusive nature of financial sector growth.

To verify the above hypothesis, we use a financial computable general equilibrium (FCGE) model for one emerging Asian economy. Indonesia is selected for the following reasons. Like most emerging markets, the country's financial sector has been growing rapidly since financial liberalization began in the 1980s, and capital inflows after the global financial crisis also rose significantly. At the same time, Indonesia's income inequality has worsened. The model is the evolution of the original FCGE developed since late 1990s (Azis 1997). After several modifications and advancements, a more detailed household income distribution and poverty module was added in Azis (2009).[11] In the current version of the model, we delineate different types of capital inflows, distinguishing inflows that generate returns on financial assets directly from those of the foreign direct investment (FDI) type. How each of these flows enters the balance sheet of different agents and transmits to the rest of the economy is captured explicitly in the model (see again the flowchart in Fig. 5.2). The channel connecting financial flows and income distribution is specified in detail by dissecting the flows as they appear on agents' balance sheets, based on the type of income generated. Scrutinizing the role and detailed transmission within the financial sector allows us to analyze the dynamics of income earned from returns on financial assets held mostly by urban-based rich households.[12] On the banking side, the model also incorporates a credit channel component that includes the financial structure of lenders and borrowers in determining a bank's willingness to lend, and the amplified effect due to currency appreciation.

To simulate the model, we use Indonesia's Financial Social Accounting Matrix (FSAM) and more detailed capital flow data. Most parameters are calibrated on

[10] Aside from income inequality, poverty and unemployment are two other social indicators endogenously determined in the model. While unemployment is derived from the difference between labor demand and fixed labor supply, the aggregate variables in the real sector (total output (X), domestic demand (D), exports (E), imports (M), and total supply (Q)) are all determined along with their respective prices (PX, PD, PE, PM, and PQ). It is PQ that sets the overall price index. The poverty line (PL) can be derived from this. When PL is matched with the endogenously determined household income, the poverty level can be estimated.

[11] During its evolution, the model was applied to the dynamics of manufacturing sector in Azis (2000). It was then used to look at the impact of financial crisis on socioeconomic conditions in Azis (2003). Since then, the monetary block has been much improved and the model used to explain the disconnect between financial and real sector in Azis (2004). A more detailed breakdown of debt was made in Azis (2008), where debt maturity and debt reprofiling were specified based on this model version to analyze the debt sustainability issue.

[12] Due to space constraint, the detailed explanations of the model and simulation results are not shown (they are available upon request).

the actual data using the (nonlinear) model specifications, while others are econometrically estimated. The validity and the predictive power of the model are tested by plotting actual data on some exogenous variables.

The shock imposed on the model is capital flows intermediated through the banking sector (bank-led flows). In Chaps. 2 and 4, these flows are shown to dominate capital flows during phase one of global liquidity. For our purpose here, two scenarios are constructed: one where recipient banks increase risk by investing in financial assets, particularly securities and equity markets (labeled "Risky" in Fig. 5.3a–c), and the other where recipient banks spend the additional funds more prudently, by using them to strengthen more liquid and safe assets ("Nonrisky").

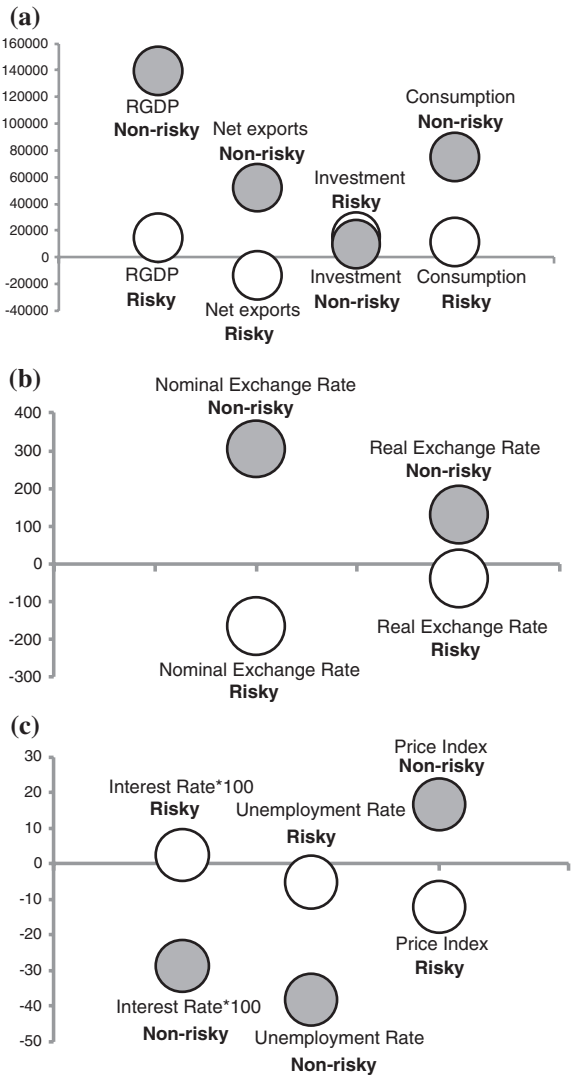


Fig. 5.3 **a** Impact of increased bank-led flows on aggregate demand. *RGDP* real gross domestic product. **b** Impact of increased bank-led flows on the exchange rate. **c** Impact of increased bank-led flows on prices, interest rates, and unemployment rate. *Source* Results of model simulations

In the first scenario, real GDP is only slightly above the baseline. So are investment and consumption. Given the augmented liquidity due to increased capital inflows, inflation and unemployment rates are lower. However, the trade sector suffers: Exports decrease and imports increase due to currency appreciation (Fig. 5.3a–c). Looking more closely, appreciation derives from higher interest rates, their level influenced by returns on financial assets. Because the issuance of financial assets increases under this scenario, prices will fall and yields rise, with interest rates also increasing. In the search for higher returns and yields, banks actively invest in these new assets instead of issuing more credit. This explains why the economy grows only slightly.

The effect on income distribution—whether measured by the disparity between rich and poor, or in terms of the rural/urban gap—is far more obvious. As shown in Fig. 5.4a, b, the inequality gets worse. Although the poverty line drops 1.2 % below the baseline, incomes for all household categories fall, despite growing GDP. Two factors are behind this: (i) Wages fall due to lower prices, and (ii) economic growth is mostly driven by activities related to the expanding financial sector. These tend to benefit only urban-rich households who depend far less on wages (factor income) than the rural-based poor. With more access to financial markets, the urban-rich accrue extra income from returns on the financial assets they hold. This is why increased bank-led flows under the risky behavior scenario worsen income inequality. And as expected, the least change is in financial income.

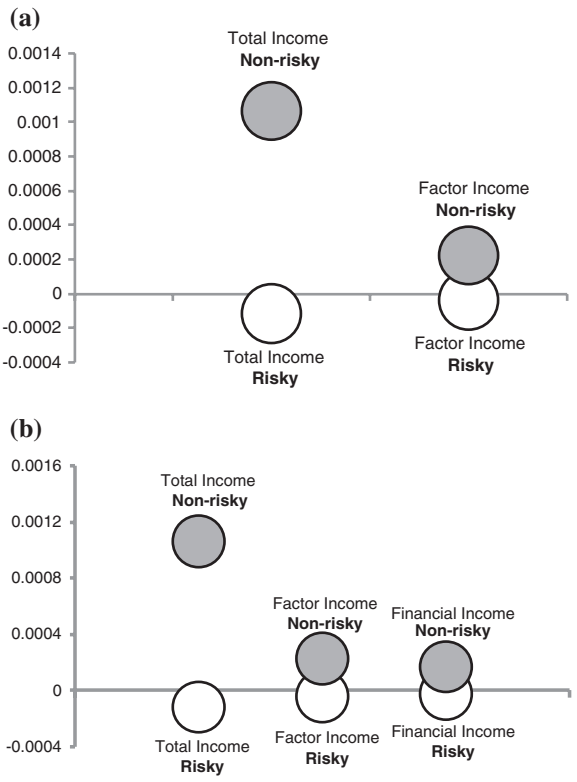


Fig. 5.4 **a** Impact of increased bank-led flows on poor/rich income ratio. **b** Impact of increased bank-led flows on rural/urban income ratio. *Source* Results of model simulations

In the "nonrisky" scenario, banks are assumed to behave prudently by extending more loans to productive sectors like manufacturing. As expected, the resulting real GDP is larger than under the "risky" scenario. The growth in investment and consumption is higher because of lower interest rates, and exports are also higher due to nominal and real exchange rate depreciation (see Fig. 5.3a, b). The unemployment rate is also much lower, though the price index is higher (see Fig. 5.3c). Thus, the macroeconomic impact is better when banks behave prudently.

Incomes of all household categories increase under this scenario. This is unlike in the previous "risky" scenario. As increased liquidity from bank-led flows is largely spent on loans to the real sector—not financial assets—output and hence factor incomes are higher. More importantly, from the income distribution perspective, the urban rich do not receive extra income from these assets. As a result, the overall income inequality narrows between rich and poor and between rural and urban households (see Fig. 5.4a, b).

Thus, the effect of increased bank-led flows on income distribution is clearly dependent on how a bank behaves. It is abundantly clear from the model simulation that the repercussions of increased bank-led flows depend on how banks react. The outcome is more favorable when banks act more prudently and do not take on increased risk. The problem is that there is no guarantee banks will behave that way. The discussions in Chaps. 2 and 4 clearly indicate that increased bank-led flows have been followed by increased bank investments in risky financial assets. Most financial institutions on the receiving end of capital inflows tend to take on more risk. As shown by the results of the model simulation, the aggregate demand and macroeconomic impact and the resulting income inequality are unfavorable. This suggests that particular measures are needed to influence the incentive–disincentive system for banks to act more prudently.

This is what macroprudential policy is expected to do. But the role of macroprudential policy is more than just reducing the risk of financial instability as discussed in Chap. 3. Its role in affecting socioeconomic development should also be assessed. Given such multiple objectives (stability in macrofinancial, microfinancial, and socioeconomic issues) and a whole range of policy options, which policy should be prioritized?

5.3 Prioritization for a Multi-objective Goal

In safeguarding the economy from the potential risks of bank-led flows, most emerging market economies refocused their policy on the asset and liability side of bank balance sheets.[13] This is a national policy taken unilaterally by each economy. But is this sufficient and effective enough to avoid the risk of the procyclicality discussed in previous chapters?

[13] On the asset side, aside from reducing loan-to-value ratios, efforts are made to contain excessive credit expansion and other risky investments. On the liability side, mitigating the increase of noncore liabilities through bank-led flows is critical because they can heighten risky bank behavior and increase leverage. See Azis and Shin (2013) and Forbes and Warnock (2012).

Given the sheer size of capital flows, would efforts to throw "some sand in the well-greased wheels of international finance" help reduce the potential risks of financial instability by limiting the risky behavior of economic agents? We have argued throughout that some sort of capital controls can help—in the form of direct quantitative controls such as imposing a macroprudential levy on bank-led flows (the role of such a levy as macroprudential policy and its application are discussed in the next chapter). But macroprudential policies at the national level may be inadequate to deal with large and volatile capital flows. Regional safety nets and cooperation can be a useful supplement, in particular to minimize the possibility and impact of financial spillovers and contagion.[14]

Because inflows and outflows are possible in an open capital account system, shouldn't we focus on how to balance outflows with inflows to limit the possibility of a crisis? Theoretically, capital outflows can be matched by retrenchment—returning foreign assets owned by domestic investors. But that works only if there are enough foreign assets. The size of these assets can only rise if capital outflows are encouraged before retrenchment is needed. This occurred, for example, in the People's Republic of China (PRC) when inflation began to rise in the mid-2000s. Since then, large capital inflows—especially FDI—and the increase in PRC surplus put strong pressure on the renminbi, forcing a roughly 6 % annual appreciation. In response, the central bank began to encourage capital outflows by the private sector and the newly established PRC Investment Corporation (CIC).[15] As a result, capital outflows from the PRC have indeed increased with low volatility (Fig. 5.5). While outflows from the Eurozone, the US, and Japan fell sharply during the global financial crisis, outflows from the PRC decreased only slightly. One of the reasons for the relative stability is the policy-driven nature of outflows, unlike the case of private flows, which almost exclusively search for better risk–return. More recently, however, non-CIC outflows increased significantly (Azis 2013).[16] Although detailed information on the breakdown of outflows is scarce, data from the balance of payments are suggestive. The share of equity and debt outflows by PRC residents and state-owned enterprises have surged along with bank lending abroad.[17] The resulting accumulation of net foreign assets fell

[14] For the status of Asia's regional financial safety nets, see Azis (2012).

[15] CIC is the second largest PRC investor overseas, ranking only behind the arm of the central bank that manages the economy's foreign exchange reserves. Attempts were also made by the central bank to share the burden with commercial banks by raising the required reserves in both local currency (sharing the burden of sterilization) and foreign currency (sharing the burden of intervention).

[16] As an example, in 2012 the PRC government approved a pilot program in Wenzhou, Zhejiang province, to allow city residents to privately invest overseas. Data on cross-border flows also show capital outflows to bond markets in other Asian economies—especially the Republic of Korea—has been rising.

[17] One estimate suggests resident lending abroad rose to $270 billion in 2012, double the amount in 2011. But the overall rise in overseas assets is due to investment by PRC financial institutions (IIF 2013).

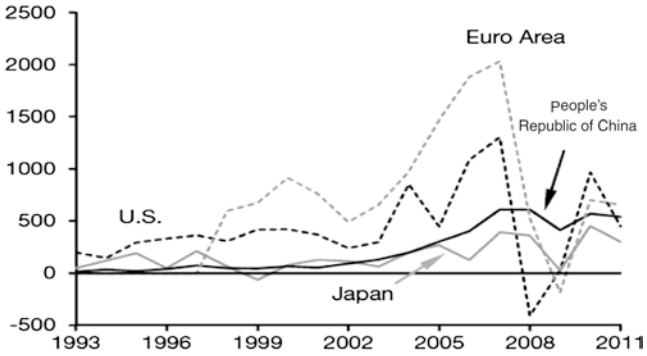


Fig. 5.5 Eurozone, Japan, United States (US), and People's Republic of China total outflows ($ billion). *Source* Institute of International Finance

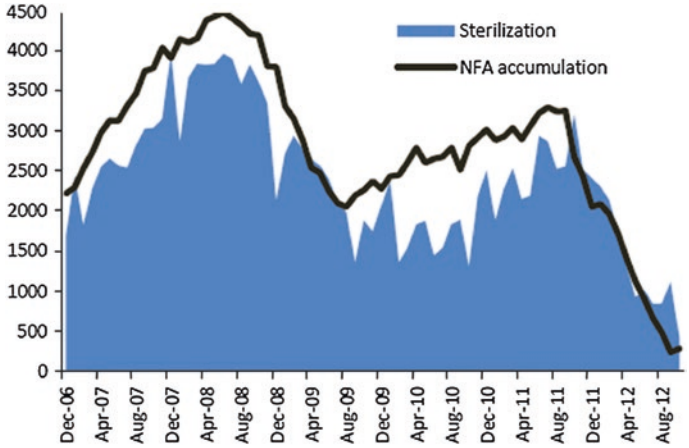


Fig. 5.6 Intervention and sterilization (CNY billion). *Source* Institute of International Finance

since mid-2011 (Fig. 5.6). By 2012, reserve accumulation declined to $85 billion (compared to $300 billion in 2011).

In prioritizing policy, therefore, three options are considered: (i) promote direct investment abroad, labeled "Encourage Outflows"; (ii) "Assign Levy" to noncore bank liabilities; and (iii) strengthen regional financial safety nets, "Reg Safety Nets." In Fig. 5.7, these three appear at the bottom of the hierarchy in each box that capture each component to consider. The logic of regional financial safety nets is to support domestic safety nets—as these remain far too inadequate—given the potential damage the unprecedented size and volatility of capital flows could

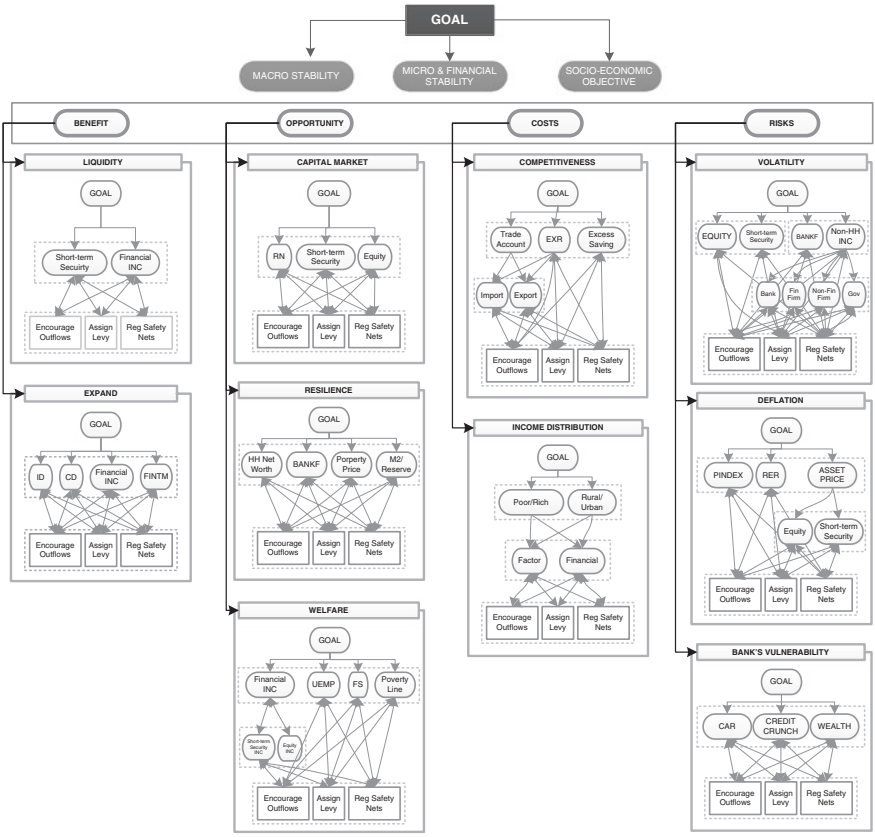


Fig. 5.7 Analytic network process (*ANP*) structure for policy options. *Source* Modified from Azis (2014) and Min (2014)

cause. The rationale for assigning a levy is to restrain rather than stop capital flows (see again the discussions in the previous chapters). Encouraging capital outflows helps maintain the stability of net flows. When capital tends to flow out in a crisis, during the boom-and-bust cycle, assets held abroad by domestic investors can act as a safeguard. They can provide a foreign asset buffer when markets become volatile. Indeed, the size of these ready-to-use foreign assets was important in some emerging market economies during the global financial crisis, the Republic of Korea being one example (Jain-Chandra et al. 2013).

So which policy works best? How do we prioritize the objectives, criteria, and the three policy options? Here, we use the analytic network process (ANP) to structure the model and quantify the weight of each model element (Fig. 5.7).[18]

[18] The figure is a slight modification of that in Azis (2014) and Min (2014), but the analysis follows the two references closely. For a detailed explanation of ANP, see Saaty (2005).

The strategic comparative goal is to achieve a balanced outcome of **MACROSTABILITY**, **MICROSTABILITY, and FINANCIAL STABILITY** and improved **SOCIOECONOMIC OBJECTIVES**, depicted at the top of Fig. 5.7. Each policy is weighted in terms of its relevance and contribution to **BENEFIT, OPPORTUNITY, COST, and RISK (BOCR)** that can be generated by increased bank-led flows. In the BENEFIT cluster, two sets of components are considered: (i) strengthen **LIQUIDITY** (the first box on the left of Fig. 5.7), through enhanced short-term securities and equity markets, along with boosted financial income, and (ii) allow investment, consumption, financial income, and imported intermediate inputs to **EXPAND** (the second box on the left of Fig. 5.7). Some beneficial impacts of increased bank-led flows, such as improved **CAPITAL MARKET**, and enhanced **RESILIENCE** may emerge only in the long run. Hence, they are listed under **OPPORTUNITY** cluster. Recipient countries can also improve overall **WELFARE**, after a certain period, if they take advantage and make good use of the increased capital inflows. The components connecting the **GOAL** and policies in Fig. 5.7 are most relevant and should be considered in prioritizing policies. For example, given an increase in bank-led flows, improvements in **WELFARE** can be fueled by a gradual increase in the financial income originating in short-term securities and equity earnings.

On the downside of bank-led flows, the short- and long-term costs (**COST** and **RISK**, respectively) are analyzed similarly, except that the priority ranking is based on "Which policy is most costly or risky?" when the following components are considered: **COMPETITIVENESS** and **INCOME DISTRIBUTION** under the COST cluster, and **VOLATILITY**, **DEFLATION**, and **BANK VULNERABILITY** under the RISK cluster. It is important to note that the reference for analyzing RISK is reversal of capital flows—as in many crisis episodes with a boom-and-bust cycle, the biggest risk in massive capital inflows is precisely that they can quickly reverse (procyclicality). However, one needs to distinguish this reversal from normal outflows from domestic investors. While useful in times of crisis—which is why one policy option is to encourage them—a capital flow reversal from investors pulling out will generate damaging capital "flight" (see again the distinction between capital "flight" and "retrenchment" discussed in Chap. 2).

The policies at the bottom of the network in Fig. 5.7 are weighted with respect to each component and subcomponent listed above them. For example, under BANK VULNERABILITY in the RISK cluster—where bank capital may deteriorate during a flow reversal—there is a risk that a bank's capital adequacy ratio (**CAR**) will deteriorate. The relevant question then is which of the three policies will likely create this risk (most risky)?

All arrows under each component in Fig. 5.7 point in two directions, implying a feedback effect for each influence from an element to the other elements below it. Thus, the structure in each box under each cluster forms a network. Taking the example of BANK VULNERABILITY in the RISK cluster again, a typical question is—"which risk is least likely to be resolved given a selected policy?" Applying pairwise comparisons, priority rankings for each feedback were made.

Table 5.1 ANP results for benefit (*B*), opportunity (*O*), cost (*C*), and risk (*R*)

	Ideals	Normals	Raw	Ranking
Benefit				
1. Encourage outflows	1	0.438129	0.858812	1
2. Assigning levies	0.994591	0.435759	0.854167	2
3. Reg safety nets	0.287844	0.126113	0.247204	3
Opportunity				
1. Encourage outflows	1	0.477338	0.826065	1
2. Assigning levies	0.712725	0.340211	0.588757	2
3. Reg safety nets	0.382225	0.182451	0.315742	3
Cost				
1. Encourage outflows	1	0.725513	1	1
2. Assigning levies	0.08878	0.064411	0.08878	3
3. Reg safety nets	0.289555	0.210076	0.289555	2
Risk				
1. Encourage outflows	1	0.488161	0.983803	1
2. Assigning levies	0.313358	0.152969	0.308283	3
3. Reg safety nets	0.735147	0.35887	0.72324	2

Source Results of ANP

The inputs used are a combination of the normalized quantitative data derived from the FCGE model simulations and analytical perceptions. The rankings based on the complex network structure are derived from the limiting super-matrix (see Appendix).

Table 5.1 shows the results of priority rankings for the three policies under the *BOCR*.[19] Thus, while to "Encourage Outflows" ranks highest in terms of its capacity to generate BENEFIT and OPPORTUNITY, the policy is also considered most costly and risky. For example, compared with "Assign Levy" and "Reg Safety Nets," "Encourage Outflows" will do the least in avoiding decreased competitiveness caused by the appreciation of real exchange rate (**RER**). On the RISK side, capital flow reversals may cause VOLATILITY in the **EQUITY** market. To "Encourage Outflows" will obviously make things worse.

[19] For example, under the BENEFIT scenario in Table 5.1, three eigenvectors are shown ("Ideals," "Normals," and "Raw"). While all three give the same ranking—encourage outflows being most preferred, followed by assigning levies, and regional financial safety nets (hence the ranking shown in the last column of Table 5.1)—the normalized eigenvector (0.4381; 0.4358; and 0.1261) under "Normal" with the sum equaling unity is the most often used. All numbers under the column "Benefit," "Opportunity," "Cost," and "Risk" in Table 5.2 show the normalized eigenvector.

Table 5.2 Overall results based on multiplicative and additive *BOCR*

ANP	Benefit	Opportunity	Cost	Risk	$(B^*O)/(C^*R)$	$bB + oO - cC - rR$	Ranking
	$b = 0.25$	$o = 0.25$	$c = 0.25$	$r = 0.25$			
Encourage outflows	0.438129	0.477338	0.725513	0.488161	0.590499767	−0.07455	3
Assign levy	0.435759	0.340211	0.064411	0.152969	15.04635304	0.1396	1
Reg safety nets	0.126113	0.182451	0.210076	0.35887	0.305205609	−0.0651	2
ANP	Benefit	Opportunity	Cost	Risk	$(B^*O)/(C^*R)$	$bB + oO - cC - rR$	Ranking
	$b = 0.25$	$o = 0.1$	$c = 0.35$	$r = 0.3$			
Encourage outflows	0.438129	0.477338	0.725513	0.488161	0.590499767	−0.2431	3
Assign levy	0.435759	0.340211	0.064411	0.152969	15.04635304	0.0745	1
Reg safety nets	0.126113	0.182451	0.210076	0.35887	0.305205609	−0.13141	2

ANP	Benefit	Opportunity	Cost	Risk	$(B^*O)/(C^*R)$	Ranking	$bB + oO - cC - rR$	Ranking
	$b = 0.35$	$o = 0.3$	$c = 0.25$	$r = 0.1$				
Encourage outflows	0.438129	0.477338	0.725513	0.488161	0.590499767	3	0.06635	2
Assign levy	0.435759	0.340211	0.064411	0.152969	15.04635304	1	0.22318	1
Reg safety nets	0.126113	0.182451	0.210076	0.35887	0.305205609	2	0.010469	3

Source Results of BOCR, based on ANP

Having calculated these priorities, the next step is to apply them to some BOCR formula. Two types are used here: (i) the multiplicative approach $(B^*O)/(C^*R)$ and (ii) the additive approach $(bB + oO - cC - rR)$.[20]

Table 5.2 lists the results. The upper panel equally ranks *BOCR*, with the last column showing the superiority of "Assign Levy." The middle and lower panels display the results of sensitivity analyses; the middle reflects a more subdued option, where COST and RISK clusters are weighted more than BENEFIT and OPPORTUNITY—the reverse case is shown in the bottom panel, representing a "buoyant" scenario. In either case, the highest preference for "Assign Levy" remains. Only the ranking of the other two policies is reversed when an additive approach is used. This suggests the superiority of placing a levy on bank-led flows is robust.

The policy analysis therefore suggests that during tranquil periods, capital outflows should be encouraged to help stabilize net flows in times of market turmoil. At the same time, this strengthens competitiveness as the exchange rate weakens. However, after considering both costs and risks, imposing a levy on bank-led flows works better. The resulting stable financial market feeds into the real economy, boosting factor income rather than returns on financial assets. This suggests it will also reduce inequality. Through sensitivity tests, the result is found to be robust. Clearly, taking a one-sided approach in evaluating policy alternatives—by neglecting the potential costs and risks of these policies—may produce a suboptimal result.

5.4 Appendix

The presence of feedback influences in a network model requires a large matrix—known as a super-matrix—that contains a set of submatrixes. The super-matrix captures the influence of elements in a network on other elements in that network. Denoting a cluster by C_h, $h = 1, \ldots m$, and assuming that it has n_h elements e_{h1}, e_{h2}, e_{h3} …, e_{hmh}, and laying out all clusters and all elements in each cluster both vertically (on the left) and horizontally (at the top), we have the super-matrix in Fig. 5.8.

The typical entry of this super-matrix is in Fig. 5.9.

The entries of submatrixes in W_{ij} are the ratio scales derived from paired comparisons performed on the elements within the clusters themselves,

[20] For the rationale of both, see Saaty and Vargas (2006).

Fig. 5.8 Super-matrix of a network

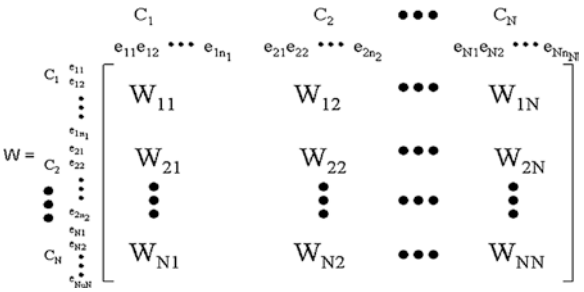
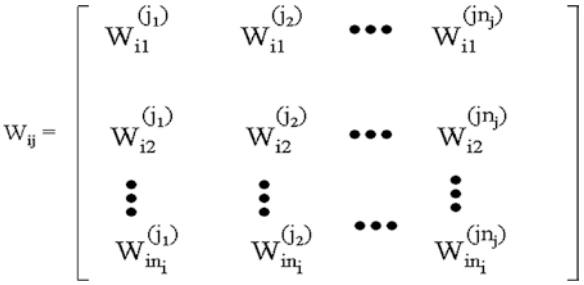


Fig. 5.9 Entries in super-matrix of a network



according to their influence on each element in another cluster (outer dependence) or elements in their own cluster (inner dependence). Judgments are elicited, from which ratio scales are derived. The resulting unweighted super-matrix is then transformed into a matrix where each column sums to unity to generate a stochastic super-matrix. The derived weights are used to weight the elements of the corresponding column blocks (cluster) of the super-matrix, resulting in a weighted super-matrix, which is also stochastic. The final ranking is derived from the limiting super-matrix, obtained by raising the stochastic super-matrix to large powers, in order to read off final priorities, in which all matrix columns are identical. Each gives the relative priorities of the elements from which the priorities of the elements in each cluster are normalized to one (the powers of the super-matrix do not converge unless it is stochastic, ensuring that its largest eigenvalue is one). Using the example of the EXPAND component under the BENEFIT cluster in Fig. 5.7, the resulting limiting super-matrix is displayed in Table 5.3.

Table 5.3 Limiting super-matrix

		Alternatives			Goal	EXPAND			
		Encourage outflows	Assign Levy	Reg safety nets	EXPAND	CD	FIN INC	FINTM	ID
Alternatives	Encourage outflows	0.18477	0.18477	0.18477	0.18477	0.18477	0.18477	0.18477	0.1848
	Assign levy	0.23605	0.23605	0.23605	0.23605	0.26305	0.23605	0.23605	0.2631
	Reg safety nets	0.07918	0.07918	0.07918	0.07918	0.07918	0.07918	0.07918	0.0792
Goal	EXPAND	0	0	0	0	0	0	0	0
EXPAND	CD	0.0745	0.0745	0.0745	0.0745	0.0745	0.0745	0.0745	0.0745
	FIN INC	0.15758	0.15758	0.15758	0.15758	0.15758	0.15758	0.15758	0.1576
	FINTM	0.13292	0.13292	0.13292	0.13292	0.13292	0.13292	0.13292	0.1329
	ID	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135

Source Results of ANP

References

Amador J, Cabral S (2009) Vertical specialization across the world: a relative measure. North Am J Econ Finance 20:267–280

Azis IJ (1997) Impacts of economic reform on rural-urban welfare: a review of urban and regional development studies 3(Spring)

Azis IJ (2000) Non-linear general equilibrium impacts of financial crisis and manufacturing downfall. Developing Econ 2(December)

Azis IJ (2003) Modeling the repercussions of financial shock on socio-economic indicators. In: Ananta A (ed) The Indonesian crisis: a human development perspective. Institute of Southeast Asian Studies, Singapore

Azis IJ (2004) Modeling the disconnect between financial policy and real sector using the financial social accounting matrix as a data system: the case of Indonesia. In: Joseph C (ed) Banking disintermediation and its implication to: a theoretical view and country experiences. Bank Indonesia, Jakarta

Azis IJ (2008) Fiscal policy and workouts from debt crises: the case of Indonesia's domestic debt. IPD working paper, pp 1–25

Azis IJ (2009) Macro stability can be detrimental to Poverty. Econ Financ Indonesia 57(1):1–23

Azis IJ (2012) Asian regional financial safety nets? Don't hold your breath. Public Policy Review 8(3):321–340

Azis IJ (2013) Inadequate regional financial safety nets reflect complacency. ADBI working paper series 411

Azis IJ (2014) Integration, contagion, and income distribution. In: Nijkamp P et al (eds) Regional science matters. Springer, New York

Azis IJ, Shin HS (2013) How do global liquidity phases manifest themselves in Asia?. Asian Development Bank, Manila

Committee on International Economic Policy and Reform (2012) Banks and cross-border: policy challenges and regulatory responses. CIEPR, Washington DC

Forbes KJ, Warnock F (2012) Capital flow waves: surges, stops, flight, and retrenchment. J Int Econ 88(2):235–251

Institute of International Finance (2013) Capital Flows to Emerging Market Economies. IIF Research Notes(October)

International Monetary Fund (2012) The liberalization and management of: an institutional view. Washington DC

Hummels D, Ishii J, Yi K-M (2001) The nature and growth of vertical specialization in world trade. J Int Econ 54(1):75–96

Jain-Chandra S et al (2013) The impact of foreign bank on Korea. IMF working paper WP/13/101

Min HH (2014) The analysis of the link between capital flows and macroeconomic-financial-spatial income distribution indicators: combining financial CGE and perception models. Dissertation, Cornell University

Saaty TL (2005) Theory and applications of the analytic network process: decision making with benefits, opportunities, costs, and risks. RWS Publications, Pittsburgh

Saaty T, Vargas L (2006) Decision making with the analytic network process. Springer's international series