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Sustainability, Finance, and a Proposal from China

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Abstract

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One of the most interesting contributions to the debate about the global financial crisis is a brief note by Zhou Xiaochuan, governor of the People's Bank of China, published by the Bank of International Settlements (Zhou, 2009). It represents one of the very few attempts to place the present financial crisis within a long-term historical perspective. It outlines a long-term strategic vision for the creation of an international reserve currency that is decoupled from individual nations, and is anchored to a stable benchmark.

¹ In this third print, we corrected for some typos, added some caption details and made minor additions.

Zhou built on the scheme for global financial governance conceived by Keynes in the 1940s, which included a mechanism for keeping macro-economic imbalances in check, and a substantial link to commodity markets.

In this paper, we highlight that striving for global financial governance is a paradigmatic example of a deeper underlying challenge. We sketch the intellectual landscape within which Keynes and Zhou conceived their proposals, discuss both approaches, and give an overview of special drawing rights (SDRs), which play a key role in Zhou's concept. Moreover, we discuss three issues related to rethinking the global financial system: the role of speculation; the debate between the various schools of currency and banking; and the question of whether safe assets actually exist.

We argue that Zhou reframed the reformation of the global financial system as a coordination exercise – in contrast to the burden-sharing exercise as it is commonly perceived. This shift in perspective is also essential for other sustainability challenges.

We focus on a specific proposal by Zhou, and suggest denominating specific financial assets in SDRs. We argue why bonds to finance European energy infrastructure could qualify to initiate such a scheme.

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1. The Financial Crisis in a Sustainability Perspective

The present architecture of international finance is not sustainable; it highlights a key problem of the global civilization in which we live: the tendency to postpone risks so that they are all but ignored by the decision-makers creating them (van der Leeuw, 2012). This pattern has shaped the histories of nuclear power, climate change, biodiversity conservation, and is presently shaping the development of the international monetary system. Postponing risks in this way may well amplify them: financial regulations for dealing with the present crisis, for example, might plant the seed for even larger subsequent crises.

A common definition of sustainable development describes it as meeting the needs of the present without risking the ability of future generations to meet their own needs. Given that perspective, it is worrying that, so far, there has been very little exchange between actors involved in sustainable development and those interested in the financial architecture of the world economy. With the present working paper, the Institute for Advanced Sustainability Studies seeks to address this situation by examining the present financial architecture from a sustainability perspective, i.e. by asking what are the main long-term risks involved and how might such risks be reduced.²

The present financial architecture engenders at least three major long-term risks:

- Efforts to stabilize the existing architecture may exclude considerable parts of the population from future prosperity, even in high-income countries. The present rise in long-term unemployment in the United States (US) and especially in Europe is a worrying signal in this regard.
- Financial crises even larger than the one starting in 2007 may lead to global breakdowns of economic activity, throwing billions of people into states of

extreme deprivation. This risk may increase if the present US dollar-based system of international trade and reserve moves towards a system with several major competing reserve currencies: As we will discuss below, dynamic systems with more than two dimensions may readily display chaotic properties.

- The difficulties of global coordination in the face of financial risks may amplify mistrust and tension between the hegemonic nation of the present and its most likely challenger. This, in turn, considerably increases the risks of small mistakes escalating into large-scale military conflicts, according to a pattern known from the onset of World War I (for some chilling reading on this subject, see Mearsheimer, 2010).

In the midst of the global financial crisis, one of the most thoughtful reflections on how to reform the international monetary system came from the governor of the People's Bank of China, Zhou Xiaochuan (2009). Zhou's proposal is noteworthy for at least four reasons:

- The People's Bank of China has played a remarkably constructive role in handling the global financial crisis that began in 2007, especially with regard to avoiding a breakup of the eurozone, stabilizing the exchange rate of the euro, and to its massive expansionary fiscal policy when the International Monetary Fund (IMF) called on all developed countries to help stabilize world demand.
- Governor Zhou proposed a truly international financial architecture as the ultimate goal, in contrast to a system based on currencies rooted in particular regions of the world, be they the dollar, euro, renminbi, or others.

- The report highlighted the need to secure global financial stability and facilitate world economic growth.

- Governor Zhou proposed a step-by-step process that leaves a great deal of opportunity for joint learning along the way, in contrast to a sudden shift to a new architecture. The initial steps involve practical measures such as strengthening the role of the SDRs (special drawing rights, presently created and managed by the IMF), for example by creating SDR-denominated financial assets. Subsequent steps are sketched-out only in general terms, taking their lead from ideas developed by Keynes during the process leading to the Bretton Woods Conference of 1944.

From a sustainability perspective, simply persisting with the existing financial architecture and hoping that future risks will take care of themselves is not a convincing option. However, it is not at all obvious what a sustainable global monetary system could look like. What is needed is a patient search for viable steps to reduce the daunting risks we have unintentionally created.

Governor Zhou proposed initial steps and signaled the willingness of China to engage in the search for an international architecture for the global monetary system. Related ideas have been advanced at the United Nations (2009) as well as by the Russian government (Iosebashvili, 2009), and Brazil (Simpkins, 2010). Zhou's proposal was highlighted by Bergsten (2009) and has received supportive comments from the IMF (2010). So far, however, the Chinese suggestion has neither been taken-up in an institutionally meaningful way, nor has it been introduced as subject of a sufficiently broad debate. There is a serious danger that the risks that became apparent with the global financial crisis will be tackled haphazardly, shunning the task of developing the global monetary system towards comprehensive stability. Zhou's proposal does not pretend to provide a master plan for how to achieve this, but it certainly provides important arguments that nobody interested in sustainable development or the global monetary system should ignore.

² *The paper is the result of a pilot workshop for a series of events conceived by IASS and the Global Climate Forum. The series is devoted to investigating what transformations of the global financial system are required to ensure a sustainable development of humankind. We are aware of the fact that neither just one paper, nor a couple of papers will suffice to comprehensively deal with this challenge. Instead, we have written the present paper with the intention to bridge between the sustainability community and the community interested in the world financial system, and stimulate a respective dialogue.*

For more information about our first workshop, cf. http://blog.global-systems-science.eu/?page_id=407, and the documents stored there.

We want to thank all workshop participants for their contributions, which inspired us to conceive of this paper. Moreover, we want to thank Ulf Dahlsten, Dirk Ehnts, Sander van der Leeuw, Moritz Remig, Sabine Sämisch, Falk Schmidt, Peter Schmidt, Jia Lyng Tang, and Leanne Ussher for their comments, discussions, and valuable support for the paper.

The first print of this paper was introduced at the 2. Open Global Systems Science Conference, which took place in Brussels in June 2013. Cf. http://blog.global-systems-science.eu/?page_id=1388.

2. Governor Zhou's Proposal

Against the background of the financial and economic crisis that began in 2007, Governor Zhou stated the ultimate objective to *safeguard global prosperity and financial stability*. He explicitly asked *what kind of international reserve currency is needed for securing global financial stability and facilitating world economic growth*.

Fundamentally, Zhou's proposal comprises four components:

- A brief analysis of the history and current state of the international reserve system.
- Short lists of beneficial features and necessary characteristics of an international reserve currency.
- A long-term strategic vision.
- A pragmatic approach, building on the IMF and on special drawing rights, for the short and medium term.

The following sections provide an overview of these four components.

2.1 A brief analysis of the history and current state of the international reserve system

According to Zhou, the frequency and increasing intensity of financial crises following the collapse of the Bretton Woods system suggest that the costs to the world of the post-Bretton Woods system may have begun to exceed its benefits. Zhou stated that the price of maintaining this system is increasing, not only for users but also for the issuers of reserve currencies.

At the core of the problem is the unresolved Triffin Dilemma, i.e. the problem that countries issuing reserve currencies cannot maintain the value of that reserve currency while providing liquidity to the world.

Historically, there were various institutional arrangements concerning reserve currencies, such as the Silver Standard, the Gold Standard, the Gold Exchange Standard, and the Bretton Woods system. Zhou held that the current system, i.e. the acceptance of creditbased national currencies as major international reserve currencies, is a rare case in history.

Zhou contrasted the current system with the Bancor proposal that Keynes suggested in the 1940s, which involved the introduction of an international reserve currency based, according to Zhou, on the value of 30 representative commodities. Zhou explicitly remarked that it was unfortunate that Keynes' proposal was not accepted, and that the collapse of the Bretton Woods system indicates that the Keynesian approach may have been more farsighted than the White approach chosen in Bretton Woods.

2.2 Beneficial features of and suggestions for an international reserve currency

Zhou stated three beneficial features of an international reserve currency:

- A super-sovereign reserve currency managed by a global institution could be used to both create and control global liquidity.
- When a country's currency is no longer used as the yardstick for global trade and as the benchmark

for other currencies, the exchange rate policy of the country would be far more effective in adjusting economic imbalances.

- This will significantly reduce the risks of a future crisis and enhance the capacity for crisis management.

A further three properties were suggested for an international reserve currency:

- It should be anchored to a stable benchmark and issued according to a clear set of rules.
- Its supply should be flexible enough to allow timely adjustment according to changing demand.
- Such adjustments should be decoupled from the economic conditions and sovereign interests of any single country.

2.3 A long-term strategic vision

Zhou presented a long-term strategic vision for the creation of an international reserve currency that would be decoupled from individual nations and able to remain stable over the long term, thus eliminating the inherent deficiencies caused by using credit-based national currencies.

Zhou was of the opinion that the creation of an international currency unit, based on the Keynesian proposal, is a bold initiative that requires extraordinary political vision and courage, but that the establishment of a new and widely accepted reserve currency with a stable valuation benchmark may take a long time.

2.4 A pragmatic approach, building on the IMF and on SDRs, for the short and medium term

Zhou suggested that his long-term strategic vision should guide a short- to medium-term reform process designed to yield win-win results for all participants. His proposal builds on the use of special drawing rights, issued and administered by the IMF. The building blocks for the suggested reform process comprise:

- The scope of SDRs should be broadened, to enable them to fully satisfy member countries' demands for a reserve currency.
- A settlement system should be established between SDRs and other currencies.
- The use of SDRs should actively be promoted in international trade, commodity pricing, investment, and corporate accounting.
- In order to increase the appeal of SDRs, financial assets should be established that are denominated in SDRs.
- The basket of currencies forming the basis for SDR valuation should be expanded to include the currencies of all major economies.
- For valuation purposes, GDP figures may also be included as a weighting.
- The allocation of SDRs can be shifted from a purely calculation-based system to a system backed by real assets, such as a reserve pool.
- Existing reserve currencies could gradually be replaced by SDRs.
- An open-ended, SDR-denominated fund could be created. This fund should be based on market practices, allowing subscription and redemption in the existing reserve currencies by various investors, as desired.

Zhou stated that, with its universal membership, its unique mandate of maintaining monetary and financial stability, and as an international "supervisor" of the macroeconomic policies of its member countries, the IMF is endowed with a natural advantage to act as the manager of its member countries' reserves. Compared with separate management of reserves by individual countries, the centralized management of part of the global reserve by a trustworthy international institution, with a reasonable return to encourage participation, would be more effective in deterring speculation and stabilizing financial markets.

3. Risks of Nation-based Reserve Currencies

3.1 Risks of a single, nation-based reserve currency

Stiglitz and Greenwald (2010, 6) list four problems of the current US dollar-based reserve system:

- It comes with large, unsustainable macro-economic imbalances;
- It exhibits high volatility, for example concerning exchange rates, interest rates, and access to capital;
- It has a deflationary bias, as hoarding of large reserves suppresses global demand;
- It gives rise to considerable inequity when poor countries lend to rich countries at low interest rates but borrow funds at high interest rates.

According to Stiglitz and Greenwald (2010, 18), there is now a broad consensus that the demand for large currency reserves contributes to building up global

imbalances. They list three main reasons for this demand:

- Precautionary savings in order to weather macro-economic volatility, in particular financial crises, without resorting to IMF assistance;
- Export-led models of growth, in combination with developments in trade agreements, that prohibit alternative instruments for supporting exports;
- High price-volatility of natural resources.

In the following we present some key data related to these phenomena. For the top-15 reserve currency holders in 2011, we show currency reserves from 1998 to 2011.

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
China	153	161	172	220	298	416	623	831	1,081	1,546	1,966	2,453	2,914	3,255
Japan	222	294	362	402	470	674	845	847	895	973	1,031	1,049	1,096	1,296
Saudi Arabia	16	18	21	19	22	25	29	157	229	309	451	421	459	557
United States	146	136	128	130	158	184	190	188	221	278	294	404	489	537
Russian Federation	12	12	28	36	48	78	126	182	304	479	426	439	479	497
Brazil	44	36	33	36	38	49	53	54	86	180	194	239	289	352
Switzerland	65	60	54	52	61	70	75	58	64	75	74	135	270	331
Korea, Rep.	52	74	96	103	121	155	199	211	239	263	202	270	292	307
India	31	36	41	49	72	104	132	138	178	277	257	285	300	299
Hong Kong SAR, China	90	96	108	111	112	118	124	124	133	153	183	256	269	285
Singapore	75	77	81	77	83	98	114	118	139	166	178	192	231	244
Germany	108	93	87	82	89	97	97	102	112	136	139	179	216	234
Algeria	8	6	14	20	25	35	46	59	81	115	148	155	170	191
Thailand	30	35	33	33	39	42	50	52	67	87	111	138	172	175
Italy	54	45	47	46	56	63	62	66	76	94	106	131	158	170

Figure 1: Total Currency Reserves per Country in Billion US dollars from 1998 to 2011

Source: Bundesbank

Three-quarters of today's total official world reserves have been accumulated since 2000 (Helleiner, 2010, 2; Wolf, 2008), from less than \$2 trillion US dollars in 1999 to more than \$8 trillion USD in 2009. Emerging and developing countries are responsible for almost

three-quarters of this increase (Stiglitz and Greenwald, 2010, 8). From Figure 2, it can be seen that China dominates this accumulation.

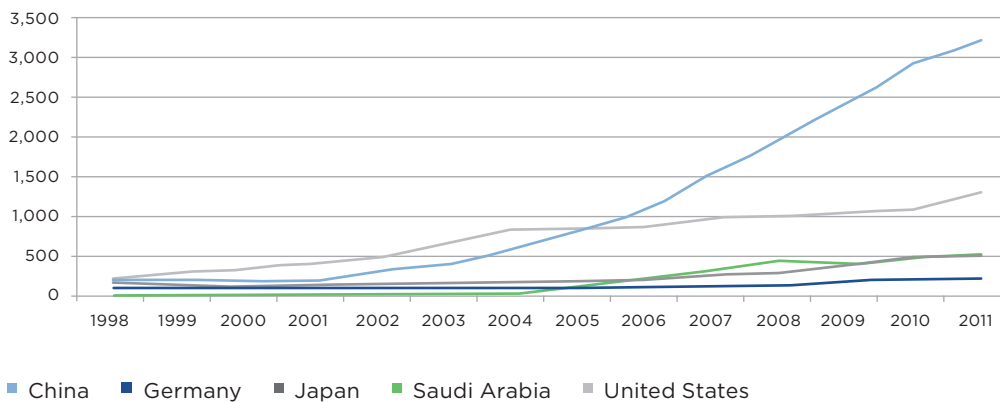


Fig 2: Currency Reserves of Selected Countries 1998–2011 (in Billion US Dollars)

Source: World Bank

Figure 3 depicts the current account balance of selected countries from 1998 to 2011; Figure 4 the current account balance of selected countries as percentage of GDP from 1998 to 2012. As can be inferred from Figures 2 to 4, the accumulation of

Chinese currency reserves in absolute terms is mostly due to the size of the Chinese economy. In relative terms, the current account surpluses of Germany and China are of the same magnitude.

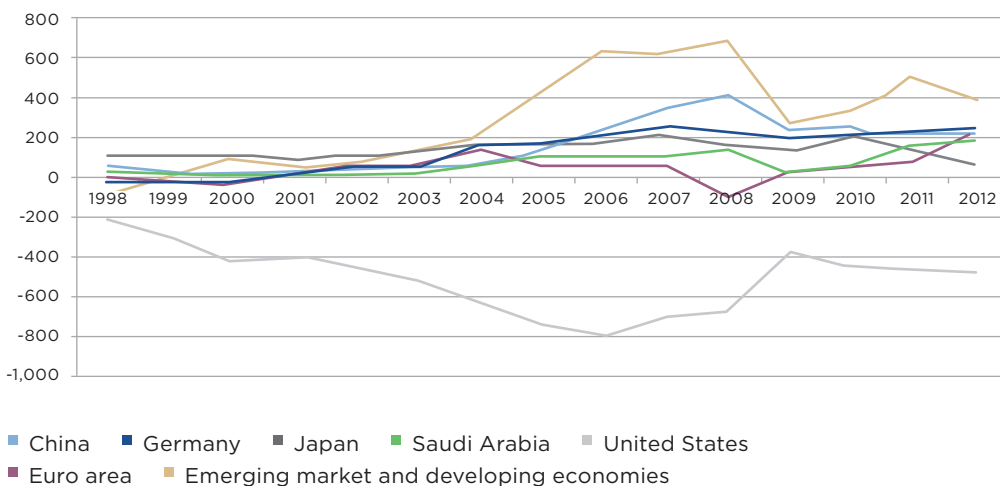


Fig 3: Current Account Balances of Selected Countries 1998–2011 (in Billion US Dollars)

Source: IMF

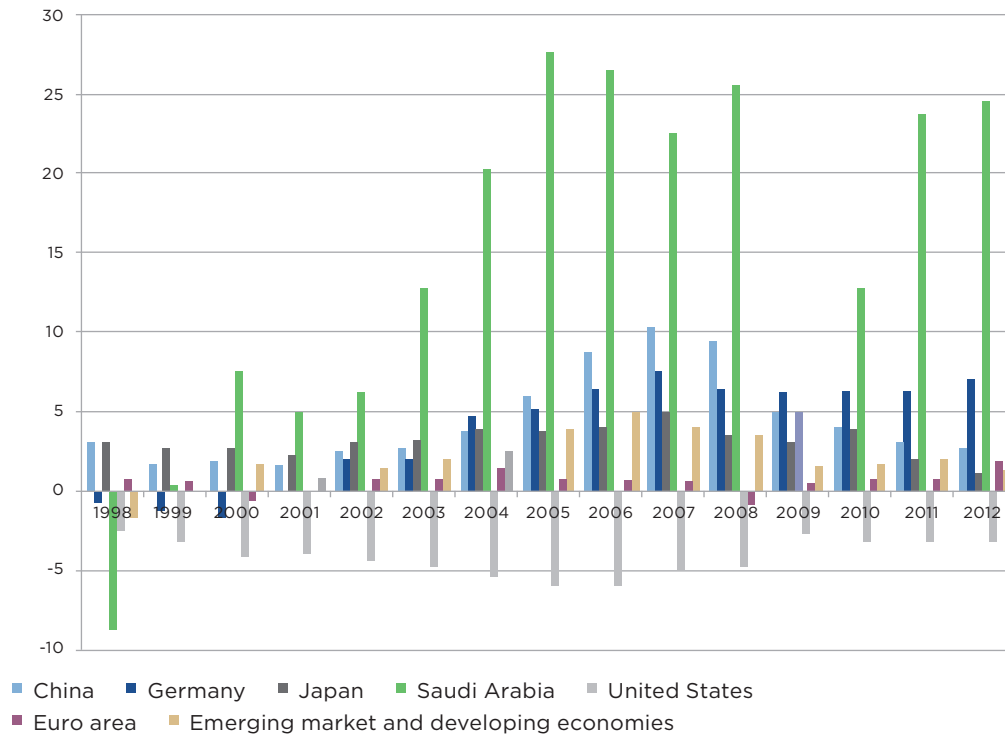


Fig 4: Current Account Balances as percentage of GDP for Selected Countries 1998-2012

Source: IMF

Figure 5 shows that the sum of all countries' absolute current account balances relative to GDP grew exponentially from the 1990s until the financial crisis hit.

It has declined since, but is still well above its value in the 1990s.

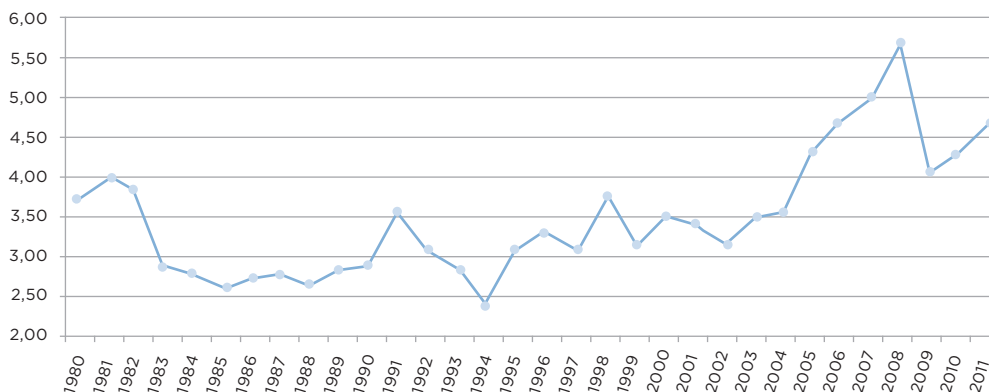


Fig 5: Average of Countries' Absolute Current Account Balances as Percentage Relative to GDP

Source: IMF, own calculations

According to Helleiner (2010, 2), reinvesting the growing currency reserves back into US assets helped fuel the financial bubble in the United States prior to the crisis. Many observers therefore identify our current dollar-based reserve system as contributing to the crisis (Helleiner, 2009, 2; Bergsten, 2009; Eichengreen, 2009b).

Figure 6 depicts prices of four commodity types from 1960 to 2010 (adjusted to US dollars for the year 2000). The indices of metals, minerals, and raw materials decreased from the 1960s to the Millennium.

The food commodity index shows the same decline, with the exception of the early 1970s, which saw a spectacular price hike. The energy price index shows a more complicated trend: The price level shifted upward in the early 1970s, made a second upward shift in the late 1970s; then, during the 1980s, returned to the elevated price levels previously seen in the 1970s. Since the Millennium, all four indices have shown tremendous price increases. Commodity exporters benefitted from this recent price spike and were able to accumulate currency reserves.

Price Index (real year 2000 US\$)

2000=100

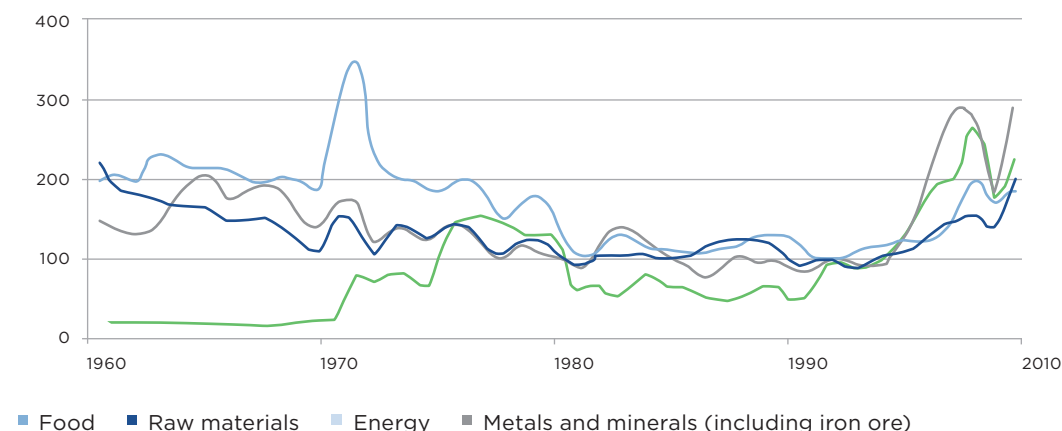


Fig 6: Price Indices of Four Commodity Types (Based on 2000 US dollars)

Source: Fischer-Kowalski and Swilling (2011, 13)

For Keynes, current account imbalances posed a major problem. He observed that, typically, deficit countries had to shoulder the burdens of adjustment, which led to severe political tensions on both the international and domestic levels. Moreover, deflationary adjustments in deficit countries risk severe repercussions when disruptive declines in exports from surplus countries trigger domestic downward spirals within the surplus countries. The current problems in the Eurozone are a striking example of this scenario.

In order to keep current account balances in check, Keynes conceived the *Clearing Union*, an institution that incorporated a *symmetric* adjustment mecha-

nism, which laid the burden of adjustment evenly on surplus and deficit countries (more information about the Clearing Union and its embedding in a wider concept will be given in chapter 4.3). Neither the Clearing Union nor any other mechanism for keeping current account balances in check was implemented internationally or within the Eurozone; therefore, it should not come as a surprise that large-scale current account imbalances could develop in both settings.

Ocampo (2010, 1) proposed that, before the financial crisis hit, although global imbalances and growing US net liabilities had been identified as potential problems for global financial stability, few commentators identified a problem within the global monetary system per se. Among those few, the concerns raised by Ocampo himself (Ocampo et al., 2007, ch. IV) were informed by the United Nations (2005), Ocampo (2007 – 8), and Stiglitz (2006, ch. 9).

3.2 Additional risks of multiple nation-based reserve currencies

Historically, there was generally just one reserve currency.³ Even after the breakdown of the Bretton Woods system, the dollar was retained as the dominant global reserve currency. This has given way to a widespread belief, among both the general public and currency experts, that the dollar will give way to a *multi-polar world reserve system* in which several national currencies will simultaneously serve as reserve currencies. This, at least, was the general mood when high-ranking experts met at Columbia University in 2009 to discuss the future world reserve system (Friedrich-Ebert-Stiftung et al., 2009), although some clearly voiced different preferences.⁴

However, it is not clear whether a multi-polar system of several national reserve currencies would provide a stable setting. The UN Commission of Experts on Reforms of the International Monetary and Financial System (United Nations, 2009) and Williamson (2009b), among others, voiced concern that a multi-polar system would be fundamentally unstable (Wyplosz, 2010, 12). Stiglitz and Greenwald (2010, 3) also suggested that a two or three-currency reserve system could be even more unstable and volatile than today's dollar-based system. In contrast, Eichengreen (2009a) contended that the bipolar dollar/sterling system that prevailed before World War I and during the 1930s was not particularly unstable (Wyplosz, 2010, 12). However, it is important to note that, at that time, the historical influence of the gold standard (with its own inherent problems) still provided a uni-polar reference.

The question of the stability of a multi-polar world reserve system relates to the *three-body problem* of celestial mechanics. The mathematical theory of dy-

namic systems predicts that, in time-continuous systems, deterministic chaos can basically arise once a system is enlarged from two state variables to three and more; i.e. the state space of a system under scrutiny becomes at least three-dimensional. It is a useful metaphor that the solar system is stable over geological timescales only because the sun is much larger than the planets, and these are much larger than their moons.

A responsible approach to risk management should take seriously that, as long as the definitive dynamics of a potential multi-polar world reserve system remains unknown, the possibility of seemingly erratic large-scale macro-economic oscillations cannot be ruled out. We particularly caution against deducing the stability of a system with more than two currencies from the alleged stability of a two-currency system.

Economically, the instability of a system of reserve currencies is related to sudden shifts in “*animal spirits*” (a notion Keynes used for a spontaneous urge to action rather than inaction; cf. our Keynes quote in chapter 5.1) and the expectations of economic actors. In combination with large-scale macro-economic imbalances, disruptive economic dynamics can ensue. A striking example is the potential for a sudden shift from the dollar to the renminbi concerning international reserve holdings (Helleiner, 2010, 6; Kirshner, 2009). This would cause a sudden devaluation of dollar assets among all creditors of the USA. In value, China would lose substantial proportions of its currency reserves. Moreover, a sudden appreciation of the renminbi would impact on the competitiveness of Chinese exports, causing a negative demand shock from collapsing exports. There is the risk that such a shock would propagate throughout Chinese society via large-scale job redundancies within the export sector, which could substantially destabilize Chinese society. However, also for the US economy, such a sudden shift could disrupt the inflow of foreign capital that, in recent decades, has replaced domestic deposits as a core mechanism of funding the US economy (for this replacement effect, cf. Schularick and Wachtel, 2012).

Even in the absence of large-scale current account imbalances, countries can become victims of stabili-

zation policies employed by nations that are emitting reserve currencies. A striking example is the stabilization policy of the US Federal Reserve (Fed) under Paul Volcker in the 1980s. In order to tackle domestic US inflation, the Fed substantially increased interest rates. The rise in interest rates propagated to other economies and impacted on their growth dynamics. This mechanism can also work in the opposite direction, when low interest rates and/or mistrust in specific reserve currencies force other currencies to lower their interest rates in order to avoid large-scale inflows of capital and subsequent

appreciation of their currencies, which would worsen their competitive position. These low interest rates can cause substantial inflationary dynamics, or fuel speculative asset-price bubbles within these countries.

There are, therefore, many possible scenarios for disruptive economic dynamics in a multipolar world reserve system. Without substantial further investigation, it is highly speculative to assume that this would provide a stable setting.

4. Bretton Woods: The Road Not Taken

4.1 Complexities of the Bretton Woods process

Governor Zhou proposed that an international reserve currency should be anchored to a *stable benchmark*. He expressed regret that the possibility to implement an international currency (the Bancor, which according to Zhou was based on the value of 30 representative commodities) was missed at Bretton Woods.⁵ The relationships between the Bancor idea and commodity markets are complex, as are the re-

lated views and actions of Keynes. Both are highly relevant to any attempt to develop the global monetary system in a sustainable way.

In the days of the Bretton Woods Conference, the political institutions of the USA and the UK had entrenched but divergent ideas about how post-war global financial governance should be organized. In 1943, Keynes led a British delegation that met several times with a US delegation led by Henry Dexter White in order to draft a joint paper that was intend-

³ In his proposal, Zhou himself refers to this stylized fact of economic history. The World Bank comes to the same conclusion (World Bank, 2011, 129). Remarkably, Eichengreen (2007) holds a different view.

⁴ As an outcome of this workshop, the Journal of Globalization and Development published a series of articles in the second issue of volume 1: Stiglitz and Greenwald (2010), Cooper (2010), Helleiner (2010), Kenen (2010a), Ocampo (2010), Williamson (2010b), and Wyplosz (2010). Williamson (2010a) provides an introduction and overview of these articles.

⁵ At the time when the Zhou proposal was published, this description of the Bancor was in accordance with the definition given in Wikipedia. According to the Wikipedia history, the text was substantially edited on 23 September 2011. Since this date, the respective Wikipedia entry no longer mentions a link of the Bancor to commodities (Our thanks go to Leanne Ussher for making us aware of this). By personal observations, we have encountered substantial confusion about the relation of Keynes' Bancor concept to commodities. In this section, we hope to somewhat reduce that confusion.

ed to outline post-war global financial governance. The delegations found that some of their positions were irreconcilable at that time. In order to save the negotiation process, the resulting joint paper deliberately included sufficient ambiguity to represent the positions of both sides. Moreover, the situation within both countries was politically complex. Both within the respective governments and legislative chambers, and between these institutions, competing interests and positions fought against each other.

The preparations for the Bretton Woods Conference comprised three parallel tracks concerning issues of currency, commerce, and commodities. Delays in the complex negotiation processes within and between the US and UK political systems concerning the issues of commerce and commodities led to several situations in which political constraints forced Keynes to omit essential details from documents or speeches concerning the currency issue, which rendered them rather opaque and difficult to understand.

4.2 Commodities as benchmarks of currency value

In currency theory, two mechanisms have been established for linking a currency to what we can interpret as a benchmark, i.e. *pegging* a currency to a benchmark, and *backing* a currency by specific assets.

Pegging a specific currency to a specific benchmark means that one unit of this currency is supposed to match the chosen benchmark. This benchmark can be another currency, the price of a specific commodity, or a price index of a basket of commodities; generally, it takes the form of an index that can be based on various items.

Backing a currency by specific assets means that the currency and asset are basically exchangeable. Historically, this typically meant that a holder of this currency could redeem a specified amount of the linked asset from the issuer of the currency upon presentation of the currency; the classical examples are paper currencies backed by gold or silver reserves. For a sustainable currency, the asset by which it is backed must hold intrinsic value.

Practically, this means that economic agents must expect that these assets can serve as stores of value and be liquid under all practically conceivable future circumstances.

The notion of *commodity buffer stocks* refers to the use of commodity storage for economic stabilization. Specifically, commodities are bought and stored when there is a surplus in the economy, and they are sold from these stores when there are shortages in the economy. The institutional buying, storing, and selling of commodities by a major actor (for example a government) can take place for one commodity, or a basket of commodities. The stock of stored commodities acts as a buffer against price volatility. When a basket of commodities is stored, stabilizing the prices of these commodities can in turn stabilize the general price level of an economy.

The use of commodity stocks to buffer fluctuations is an ancient idea. For instance, the Bible (Genesis 41 – 47) tells how the Egyptians learned to store food during the seven years of plenty, and to then release it during the seven years of famine. Classical China also operated commodity buffer stocks – particularly during consolidation under the Sui Dynasty in the 7th century AD. There is also much evidence that many other civilizations throughout the world have operated commodity stock schemes to promote economic stability.

Henry A. Wallace, US Secretary of Agriculture under F. D. Roosevelt, brought these ideas to North America. Wallace had learned (from Chen, 1911) that in China, as early as 400 BC, buffer stocks were used to dampen price oscillations; and that in 54 BC, Keng Shouchang came up with the notion of *Cháng píngcāng* (常平倉), which Chen translated as *constantly normal granary*. Wallace seems to have coined the term *Ever-Normal Granary* in his own writings (cf. Bodde, 1946, 415).

In 1937, investment legend Benjamin Graham planned to back the US dollar with a basket of commodities and stabilize a price index of this basket. Benjamin Graham and David Dodd's 1934 book on *value investing* remains the 'Bible' of Wall Street; however, it is now largely overlooked that Graham applied his idea

of *intrinsic value of assets* not only to micro-economic questions, but also to macro-economics.

In 1941 and 1942, Frank Graham, professor of economics and international finance at Princeton, suggested establishing an international commodity reserve currency (Graham F., 1941; 1942). In 1943, F.A. Hayek praised the proposals for a commodity reserve currency by both Grahams and advocated establishing an international commodity reserve currency backed by a basket of commodities (Hayek, 1943). In 1944, Benjamin Graham extended his proposal from the national to the international level and proposed an international commodity reserve currency (Graham B., 1944).

Also in 1944, the two Grahams joined forces to form the *Committee for Economic Stability*, which included a number of other academics, Wall Street practitioners, and government policy makers. This group formally submitted a proposal to the Bretton Woods Conference that a commodity reserve currency be added to the planned IMF charter.⁶

4.3 Keynes' comprehensive approach to global financial governance

Already in 1941, Keynes had developed a proposal for global financial governance comprising four international post-war institutions (cf. Moggridge, 1980; Ussher, 2012):

- An international clearing union – ICU;
- A reconstruction and relief organization;
- An international police force;
- An international commodity corporation – ICC.

Keynes had the ambition to foresee a comprehensive approach to post-war global financial governance. He conceived the four institutions as complementing each other and addressing the most important problems, as he perceived them, including:

- To overcome the deflationary gold standard;
- To create a form of global financial governance that would support prosperity and economic growth for all nations;
- To stabilize the global economy and keep global current account balances in check;
- To allow countries discretion for their domestic fiscal and wage policies;
- In case actual current account imbalances became excessive, to have a symmetric mechanism to allocate the burden of adjustment equally on surplus and deficit countries;
- To help war-torn countries (both victors and vanquished) recover from the devastation of the war;
- To help the UK deal with its enormous debt burden accrued from financing the war;
- To keep price oscillations in commodity markets within acceptable bounds.

Central to Keynes' approach was to implement the banking principle for an international reserve currency, i.e. real credit money, issued by the Clearing Union. For this currency, Keynes eventually coined the notion *Bancor*. Keynes aimed to eventually decouple Bancor from gold by introducing an asymmetric scheme: Gold buys Bancor, but not the other way around; i.e. gold would no longer have been redeemable.

Keynes intended to use this credit money to finance stockpiles of several key commodities. The latter aimed to stabilize commodity prices and enhance the liquidity of commodities with the goal of stabilizing the purchasing power of commodity-producing countries; this would entail (via stabilizing their demand for manufactured goods) also stabilizing the industrial production of exporting countries. Moreover, the buffer stocks would allow for a counter-cyclic stabilization policy and thus supplement public works financed by deficit spending.

⁶ Unfortunately, this document has never been published (Ussher, 2012, 14).

Due to his ill health and strategic focus on the currency negotiations, Keynes remained in the background of the commodity negotiations. His most visible contribution was the proposed *Finance of Buffer Stocks*, which presented a practical mechanism to partially back the dollar with commodities (Keynes XXVII, 197).⁷ That proposal met opposition from the Bank of England.

Remarkably, in 1942, the White plan also incorporated the idea of buffer stocks (Keynes XXV, 165). In 1944, as a result of American proposals, negotiations on commodities, trade, and employment were merged into one negotiation stream with the goal of creating the International Trade Organization. Proposals circulated in these negotiations contained provisions for inter-governmental commodity agreements, which were non-committal on buffer stocks and generally anti-restrictionist in tone. The proposals represented a series of guidelines for such agreements, but lacked the detail of Keynes' earlier proposals. The International Trade Organization never took off, but provisions for commodity agreements remained in the General Agreement on Tariffs and Trade (GATT) and in the March 1947 guidelines of the Economic and Social Council of the United Nations for its Interim Committee for International Commodity Agreements (Keynes XXVII, 199).

4.4 The Bretton Woods outcome

As previously outlined above, the Bretton Woods negotiations involved a complex process. Years of preparations preceded the conference at Bretton Woods, and the conference itself gave rise to further complex negotiations. Although detailed discussion of this process is beyond the scope of the present paper, some words on the strategic setting seem appropriate, particularly in view of the possibility that, in the 21st century, China will replace the US as the most influential global economy.

On a very strategic level, it was clear when Bretton Woods was negotiated that the world financial center was shifting from London to New York. As the war efforts were essentially financed by the USA, this left the US as creditor to a highly indebted UK. In the US, one important faction had the strategic goal of establishing a global financial governance scheme with

the dollar as world reserve currency and eliminating trade restrictions, which primarily meant pushing back the British Empire. Dollar dominance and a free trade regime thus attacked the vested interests of the UK and the Commonwealth. The other important US faction was the isolationist community. This presented the British with a delicate challenge: When fighting the American thrust for dominance, they faced the risk of strengthening the isolationist faction in the US. However, it was clear to Keynes that US withdrawal, as happened after the First World War, would be disastrous for Europe and the UK. Together with high indebtedness to the US, this put the UK in a very weak negotiating position. Felix (1999, 273) summarized it accordingly:

“By the time of the Washington meeting, the Realpolitiker Keynes had bowed graciously to US power. In April 1943 he put it this way to Frederick Phillips at the Treasury: ‘I have been quite conscious that we were in a sense propagating for the Harry White scheme by pressing the Clearing Union the way we have.’ With perfect vision he saw that the details were not as important as an American commitment: ‘The real risk is that there will be no plan at all and the Congress will run away from their own proposal.’”

In February 1944, in a letter to the Chancellor of the Exchequer, Keynes very lucidly sketched the strategic alternatives: i) A sterling currency bloc; ii) An Anglo-American currency bloc offered as an international scheme; iii) The dominance of the dollar. In the UK, the political debate discussed the choice between options i) and ii), whereas in the US, the debate concerned ii) and iii). The US would not allow i), and the UK would not be strong enough to support i). Keynes concluded that ii) was the only way of avoiding iii), and was very outspoken on this issue:

“No one seriously supposes that we can form a currency bloc, which discriminates against American exports, and simultaneously ask America for large-scale financial assistance on easy terms for the purpose of providing this currency bloc with resources.” Keynes (XXV, 410f).

For a long time, Keynes believed in the viability of option ii), and conceived the Clearing Union accordingly. In his alternative plan, White used the notion of *Unitas* for the international reserve currency.⁸ While Keynes still believed that *Unitas* represented a truly supra-national reserve currency, White had already secretly replaced the term *Unitas* with the term *dollar* in those versions of his documents that were submitted to the US Treasury, while still using the *Unitas*-versions in the negotiations with the British.

At the Bretton Woods Conference, White masterfully orchestrated a conference process that essentially approved the US plans and outmaneuvered the British delegation led by Keynes. The UK Parliament did not want to accept the outcome of the conference but faced an ultimatum by the US government, which linked British acceptance of the Bretton Woods outcome to the granting of badly-needed loans.

For Keynes, the negotiation process culminated in March 1946 at the Savannah Conference, which saw the inauguration of the IMF and the World Bank. Keynes worked hard for the goal of locating these new institutions at New York, but failed. In a letter to Richard Kahn, a Keynes scholar and economist colleague at Cambridge, he openly voiced his severe disappointment about the outcome of the political process:

“The Americans have no idea how to make these institutions into operating international concerns, and in almost every direction their ideas are bad. Yet they plainly intend to force their own conceptions through regardless of the rest of us. The result is that the institutions look like

becoming American concerns, run by gigantic American staffs, with the rest of us very much on the side-lines. I am sure that when they get down to operations things will not work out as they are expecting. Perhaps it is only at that stage that criticism will become effective. At present I can only say that I am pretty pessimistic. The Americans at the top seem to have absolutely no conception of international cooperation; since they are the biggest partners they think they have the right to call the tune on practically every point. If they knew the music that would not matter so much; but unfortunately they don't.” Keynes (XXVI, 217).

⁷ In this paper, for convenience of reading, we reference all volumes of the Collected Writings of John Maynard Keynes in this format. Please note that in our list of references, we include them in the appropriate bibliographical format. For Keynes XXVII this is: Keynes, J. M. (1980): *Activities 1940–1946: Shaping the Postwar World: Employment and Commodities*, The Collected Writings of John Maynard Keynes, Volume XXVII, edited by D. Moggridge and E. Johnson, Royal Economic Society, Cambridge: MacMillan and Cambridge University Press.

⁸ In March 1943, Keynes compared his plan with that of White, cf. Keynes XXV, 215.

5. Rethinking the Global Financial System

5.1 Speculation and systemic risk

In the past two decades, many aggregates of the financial sector saw considerably higher growth rates

than those of the real economy. Figure 7, for example, depicts daily crossborder payments and world trade from 1980 to 2010; Figure 8 shows German GDP and banking assets from 1950 to 2010.

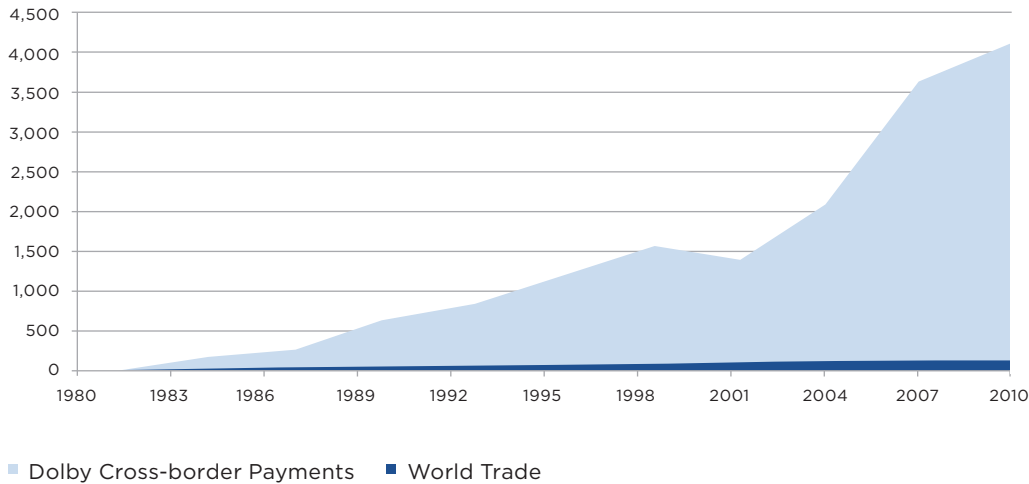


Figure 7: Daily Cross-border Payments and World Trade from 1980 to 2010

Source: BIS, via Lietaer (2012, 50)

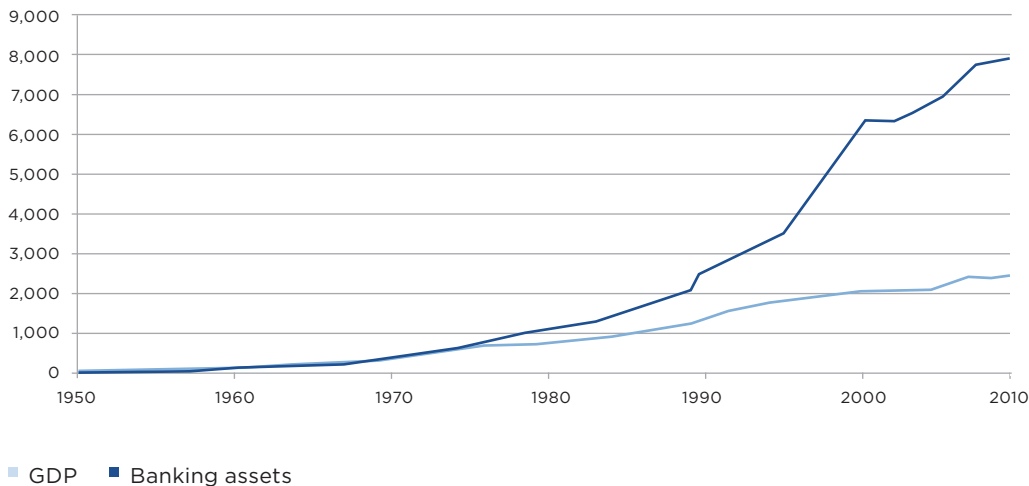


Figure 8: German Nominal GDP and Total Banking Assets from 1950 to 2010 (in Billion Euros)

Source: Bundesbank, total assets of all German banks, time series OU0308, GDP www.destatis.de. Peetz and Genreith (2011, 42)

A heated debate is ongoing about why financial aggregates grew much faster than real aggregates. Schulmeister (2010) lucidly contrasted two schools of thoughts concerning financial markets, which he called the “fundamentalist hypothesis” and the “bull–bear hypothesis.” The fundamentalist hypothesis builds on Friedman (1953) when assuming that speculation is essentially stabilizing, which means that it moves prices smoothly and quickly to a single fundamental equilibrium. Moreover, endogenous overshoot caused by excessive speculation does not exist. Any deviation of asset prices from their fundamental equilibrium is due to exogenous shocks and, hence, is only a temporary phenomenon. In this extreme view, the emergence of news and shocks follows a random path, as do asset prices. Therefore, speculation techniques based on past prices cannot be systematically profitable (otherwise the market would not even be “weakly efficient”).

According to the bull–bear hypothesis, financial markets are driven by endogenous dynamics originating from the interference of heterogeneous actors, market moods, and social factors. As a result, prices develop in irregular cycles around a fundamental equilibrium without any tendency to converge towards this level.

Keynes is widely perceived as Friedman’s counterpart, and is associated with what Schulmeister calls the bull–bear hypothesis. In Keynes’ thinking, endogenous economic dynamics and the tools for keeping them in check played a prominent role. Combining Keynes’ thinking with the richness of tools developed in the theory of dynamic systems since his time seems a straightforward and promising approach.

It is from this perspective that we introduced the three–body problem of reserve currencies in chapter 3.2. This problem may give rise to tremendous challenges for actual policy, because it may turn out that, mathematically, the equilibrium of financial markets is a strange attractor in a phase space of at least three dimensions. Alternatively, it may turn out that economies may be characterized by sudden switches between a multitude of equilibria. It should be mentioned that a central result of general equilibrium theory is that, under the standard assumptions made

in this approach, a general economic equilibrium is by no means unique or stable.⁹

The dominant political drive to understand systemic risks is likely to impact the debate on the fundamentalist and bull–bear hypotheses. It has become clear that models that assume a unique and stable equilibrium, and representative rational agents, are of limited value for actual policy– and decision–makers (Trichet, 2011). Instead, recent work has focused on the *structure* of financial markets. One prominent example is the interconnectedness of balance sheets in the financial network, and potential bankruptcy cascades within this network (cf., for example, Battiston et al., 2012a, 2012b; Delpini et al., 2013; Vitali et al., 2012; Koo, 2008).

Keynes did not deny that speculation could be stabilizing. He was, however, aware that whether speculation actually is stabilizing or destabilizing is a matter of specific circumstances in specific situations. The subject of economics is to abstract and generalize those situations in which speculation actually has stabilizing impacts, and in which it is destabilizing. From such a perspective, simply assuming that speculation is always stabilizing would not be externally consistent; i.e. not in line with stylized facts of economic life.¹⁰ Keynes was well aware of herd behavior and the working of what he termed *animal spirits*, in his words:

“Even apart from the instability due to speculation, there is the instability due to the characteristic of human nature that a large proportion of our positive activities depend on spontaneous optimism rather than mathematical expectations, whether moral or hedonistic or economic. Most, probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as the result of “animal spirits” – a spontaneous urge to action rather than inaction, and not as the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities.” Keynes (1936, 136).

⁹ This is the result of the Sonnenschein–Mantel–Debreu theorem. Cf. Balasko (2009).

¹⁰ For the notion of external consistency, cf. Colander et al. (2009).

Likewise, Keynes did not assume that economies, or a system of economies, would inherently converge to a unique equilibrium. For Keynes, it was an explicit task for policy makers to keep de-stabilizing macro-economic imbalances in check. On the strategic level, this means conceiving governance schemes that help policy makers accomplish this task.

Using Schulmeister's distinction as introduced above, the typical interpretation of proponents of the fundamentalist hypothesis is that the financial sector has made considerable progress in recent decades in making the contract space more complete. Referring to Walrasian General Equilibrium Theory, the idea is that by making the contract space more complete, the financial sector serves the real economy. In its extreme manifestation, this position deems all financial contracts as benefiting the real economy.¹¹

The extreme counter-position is to dismiss any financial transactions that exceed the flows of the real economy as pure speculation – a position held, for example, by Lietaer et al. (2012).

A reasonable assessment would probably start from the impression that neither of the extreme positions are convincing, which was actually Keynes' position. A specific characteristic of Keynes' thinking is that he perceived part of the economist's job as conceiving governance schemes to mobilize the potential of financial markets to serve the real economy, while keeping destabilizing speculation in check. He contrasted *speculation* as "the activity of forecasting the psychology of the market" with *enterprise* as "the activity of forecasting the prospective yield of assets over their whole life." According to Keynes, professional investors

"...are concerned not with what an investment is really worth to a man who buys it 'for keeps', but with what the market will value it at, under the influence of masspsychology, three months or a year hence. Moreover, this behaviour is not the outcome of a wrong-headed propensity (...) For it is not sensible to pay 25 for an investment of which you believe the prospective yield to justify a value of

30 if you also believe that the market will value it at 20 three months hence."
Keynes (1936, 155).

Keynes famously likened this to a *beauty contest*, in which

"...each competitor has to pick, not those faces which he himself finds prettiest, but those which he thinks likeliest to catch the fancy of the other competitors, all of whom are looking at the problem from the same point of view. It is not a case of choosing those which, to the best of one's judgment, are really the prettiest, nor even those which average opinion genuinely thinks the prettiest. We have reached the third degree, where we devote our intelligences to anticipating what average opinion expects the average opinion to be. And there are some, I believe, who practise the fourth, fifth and higher degrees."
Keynes (1936, 156).

Orléan (2005) calls this the *self-referential hypothesis* of financial markets.

In order to support "the long-term investor (...) who promotes the public interest", Keynes proposed "the introduction of a substantial Government transfer tax (...) with a view to mitigating the dominance of speculation over enterprise in the United States" (all brief quotations from Keynes in this section are from Keynes, 1936, 157f; Brookway, 1982, 516).

It is, however, a tremendous challenge – for both empirical and theoretical economics – to discriminate between harmful, destabilizing speculation and financial activities (however called) that serve the real economy. These financial activities come in two varieties: The first is *financing* long-term investors, be it households, firms, or governments; the second is allowing economic actors to *reallocate risks* in a manner beneficial to society.

One example of the practical challenge of discriminating between harmful and beneficial financial activities is the hotly-debated issue of speculation on global agricultural markets.

Mehrling (2011) recently provided another example of the danger of too easily dismissing the potential benefits of speculation. Mehrling's hypothesis is that part of the fast-growing financial sector could reflect a *synthetic commodity reserve currency*, which – in contrast to traditional commodity reserve currency approaches – operates with zero actual inventories of commodities; the core of this scheme is a combination of dollar holdings and commodity futures.

The scheme would help international dollar-investors deal with the risk of dollar devaluation. In order to hedge against this risk, investors purchase futures on a broad commodity index to an amount equal to their dollar holdings. A possible fall in their dollar position against the referenced commodity portfolio would automatically be compensated by a rising value of their commodity futures position, and thus stabilize their real holdings.

Mehrling argued that it was the additional demand among dollar investors for commodity futures that pushed futures prices away from their fundamentals in recent years.

If Mehrling is correct, this self-organized synthetic commodity reserve currency would be a first manifestation of the vision that Friedman (1984) stated when he argued that futures markets could deliver the same service as a commodity reserve currency.

Concerning the future evolution of the global currency system, Mehrling made a remark that deserves the attention of practitioners and academics alike:

“If (and it is admittedly a big if) current commodity price movements are being driven by unbalanced demand in the commodity futures market, then evolutionary change toward a multilateral national currency reserve system will work only if the currencies in question are able to meet that unbalanced demand.”

It is in no way obvious whether Mehrling is on-target, which is a point he explicitly voiced himself. Moreover, it is also unclear whether a self-organized synthetic commodity reserve currency would work to the benefit of society. This is clearly a matter for future research.

5.2 The currency and banking puzzle

We perceive Zhou's proposal as an important contribution to a debate that has continued for nearly two centuries, i.e. the debate between currency and banking schools.¹² According to the currency school, creating money is the prerogative of the state. A fully-fledged gold currency, as implemented by Peel's Bank Charter Act in 1844, is the paradigmatic historical application of this theory. The post-Millennium financial crisis has revived the community of advocates for reintroducing the gold standard, which achieved quite some visibility, particularly in the US.

Another suggestion in line with the currency school is the *Chicago Plan*, i.e. the idea to abolish fractional reserve banking by implementing a reserve requirement of 100 percent. Prominent US economists conceived the historic Chicago Plan in the 1930s in order to restore public confidence in the banking system and fight the Great Depression. Recently, Benes and Kumhof (2012) presented a contemporary version of the Chicago Plan.

A key motive behind the currency school and its historic manifestations is that its proponents are uneasy with giving the private sector the discretion to issue currency, particularly when they do not see how creation of currency can be kept in check. The general fear is that when striving for individual profits, private banks create too much money and thus endanger the stability of the whole system. As governments can also not be relied upon to exercise due discretion under all circumstances, the ideal scheme would be an automatic one in which neither governments nor private banks would have discretion for money creation. This was the (counterfactual) textbook ideal of

¹¹ As Colander et al. (2009) remark, this result rests on an extremely stylized model that is too abstract to be confronted with data.

¹² That debate may be traced back to a much older tension, namely the one between palace and temple money (see Harris, 2008).

the gold standard, and also the ideal of the Chicago Plan, which envisages that banks can only lend what they receive in deposits from economic actors.

Hayek (1976) tackled the problem from a radically different angle via the concept of *currency competition*, i.e. by a specific manifestation of the banking school. The general principle of this approach is that competition between banks for customers and their deposits will bring about a viable and stable banking sector. According to this theory, it is in the best interest of each bank to pursue money creation in a way that make their customers expect the stability and solvency of the bank. In a process of competitive selection, only the best performing banks survive. Hayek's concept of currency competition is an example of a pure manifestation of banking theory, as he does not see any necessity for central banks. Contemporary manifestations of banking theory comprise grassroots movements advocating *community money*, particularly those advocating abolishing central banks and commercial banks.

A hybrid solution has historically evolved, combining aspects of both currency and banking theory. Commercial banks have the discretion to create money, but base this process on central bank money, which they cannot create themselves. This money is created by central banks that are operated by states. In each state, there is only one central bank, which has a monopoly on issuing the single currency which the state accepts for paying taxes.

Pegging currencies to a specific benchmark and backing currencies by specific assets are concepts that try to accomplish the goal that both the currency and banking schools aim for, i.e. keeping money creation in check via specific technical approaches. Basically, either concept can be combined with currency and banking approaches, respectively, but not all possible combinations have historically been explored.

It is not possible to exactly locate Zhou's proposal along the spectrum of currency and banking theories, as it only generally addresses the necessity of anchoring an international reserve currency to a "stable benchmark" without providing specific details. Likewise, Zhou's requirements that this currency should be issued according to a clear set of rules, and that its

supply should be sufficiently flexible to allow timely adjustment according to changing demand, lack details that would allow specific policy schemes to be derived from them. We perceive these demands as an invitation to the academic and political communities and civil society to think through specific schemes and assess whether they meet the requirements as outlined by Zhou.

5.3 The safe asset quest

Established financial theory simply *assumes* that there are safe (i.e. riskless) assets. This assumption is of fundamental importance for the asset pricing and risk management models of the financial industry. Prior to the recent financial crisis, safe assets were simply equated with government bonds issued by AAA-rated states. This assumption was reflected, for example, by financial regulations such as Basel-II, according to which banks were not obliged to back their holdings of such bonds with equity.

The unfolding financial crisis saw considerable erosion of AAA-rated states, and many economic actors meanwhile questioned whether safe assets actually exist. This is a major challenge for the financial industry, as practically all of the sector's workhorse models rely on the assumption that risk-free investment is possible. Assuming that no safe assets exist thus results in a situation in which it is common knowledge that the financial industry employs inappropriate models.

There are basically two ways of interpreting the use of models in the financial sector. In line with Schulmeister's *fundamentalist hypothesis*, the common mindset in the financial industry can be described as a detecting perspective, i.e. a state of affairs in which financial models attempt to depict financial reality as best as they (objectively) can. From the perspective of this mindset, financial models are analogous to a radar for determining the financial landscape. Once it becomes common knowledge that a core assumption of these models is invalid, the radar findings are also revealed as being unreliable.

An alternative interpretation of financial models is that their main purpose is to coordinate actors' expectations. According to this view, financial models

are no radar, but rather technical tools for constructing and maintaining *conventions*, which help stabilize actors' expectations and frequently lead to self-fulfilling booms and busts. Assessed from the perspective of this mindset, rendering a core assumption of these models invalid may or may not impact the daily routines of financial trading.

Both the relevance of these competing hypotheses concerning the role that models play in the financial community, and the relative importance of the two mindsets, are matters of empirical research. For the purpose of the topic of the present paper, let us assume that it matters for sufficiently many economic actors whether or not they can invest into safe assets; the question then arises: which assets currently remain as candidates for safe investments?

One way of approaching this question, and of complying with financial regulation, is to rely on AAA-scores produced by the rating agencies. Unfortunately, the eleven states that are currently best rated with stable outlook are rather small and will not deliver sufficient numbers of bonds to invest in during the years to come.¹³

Another perspective is to ask which states will be sufficiently stable to weather even big hits and withstand large crises of any sort. The future of the eurozone seems rather uncertain, threatening even the long-term performance of its AAA-rated members (Finland, Germany, Luxembourg, and the Netherlands). When looking for a state with high GDP (both absolute and per capita), a growing population, well-developed financial and real sectors, a currency of its own disposal, and a high share of domestic consumption that, together with plenty of natural resources, results in a high potential for self-reliance, the natural choice seems to be the USA. This choice may be made despite the country's current AA+ rating with negative outlook, as it may be comforting to know that US bonds will, in extremis, be defended by the Pentagon.

If, indeed, sufficient economic actors come to the conclusion that US government bonds are the single safe asset in mass supply, this would make a transition from the present US dollar-based world currency regime to an alternative regime rather unlikely. The big question is thus: which assumptions will the mass of economic actors make in the years to come, and how will financial industry deal with the challenge of missing safe assets.

5.4 The Pasteur principle

Science is often seen as progressing from basic research, where empirical data are used to produce reliable theories, to practical applications, where those theories are used for successful action. Sometimes, however, practical problem-solving and theoretical inquiry can and must proceed hand-in-hand. The research by French microbiologist Louis Pasteur is an impressive example of this kind of inquiry.¹⁴

When discussing the prospects of a sustainable financial system, it is worth keeping in mind Keynes' famous quote, according to which:

"Practical men, who believe themselves to be quite exempt from any intellectual influence, are usually the slaves of some defunct economist. (...) I am sure that the power of vested interests is vastly exaggerated compared with the gradual encroachment of ideas." Keynes (1936, 383).

We cannot wait for a thorough theoretical understanding before reforming the international monetary system; but neither can such reform proceed without sustained effort to improve the knowledge base presently available when dealing with the global economy of our times.

¹³ These eleven states are Australia, Canada, Denmark, Finland, Germany, Hong Kong, Liechtenstein, Norway, Singapore, Sweden, and Switzerland.

¹⁴ See www.asu.edu/president/inauguration/address/address.pdf. See also Stokes (1997), who coined the notion of Pasteur's Quadrant to describe use-inspired basic research. In his four-quadrant scheme, Stokes associates Bohr's Quadrant with pure basic research and Edison's Quadrant with pure applied research.

6. Touching Stones to Cross the River

So far, the international monetary system has developed as a key component of globalization as centered around “The West,” represented first by the United Kingdom, then by the United States. It seems highly likely that in the 21st century this pattern will give way to another, whose contours are still very difficult to delineate (Morris, 2011). Against this backdrop, Governor Zhou’s proposal leads to a simple question: Is the West willing to engage in the search for a supra-national architecture of the global monetary system?

This search will take a long time and requires the ability to walk cautiously through clouded and sometimes turbulent waters. It is best undertaken in the pragmatic spirit captured by the Chinese saying “Touching Stones to Cross the River.” Governor Zhou suggested taking the present instrument of IMF-issued SDRs as a first stepping-stone.

Basically, special drawing rights (SDRs) are options, issued by the IMF. Their holder can ask the IMF to arrange a deal between the holder of SDRs and another IMF member. For each SDR that the holder is willing to exchange, he will thus receive freely usable currencies – presently comprising US dollars, euros, pounds sterling, or yen (IMF, 2011, 7). The US dollar-equivalent of the SDR is posted daily on the IMF’s website. It is calculated as the sum of specific amounts of the four basket currencies valued in US dollars, on the basis of exchange rates quoted at noon each day on the London market (IMF, 2013a). In the past decade, its values ranged from 1.35433 USD/SDR to 1.66743 USD/SDR. In early April 2013, the value was 1.50125 USD/SDR.¹⁵

SDRs were conceived in the late 1960s to tackle a then-pressing issue: In the Bretton Woods system, the US dollar acted as the key currency. In the 1960s, a limited international availability of dollars had been expected, and the SDRs were introduced as a remedy

for this problem. Their name indicates a crucial difference to the ordinary drawing rights of member states. When a country subscribes a *quota* at the IMF, this gives it the right to use a certain amount of the IMF’s currency reserves *conditional on* IMF approval of the country’s policy. SDRs give their holder an *unconditional option* to obtain currencies in exchange for SDRs. It is this *unconditionality* that makes them special (Endres, 2005, 81).

As Cooper (2010, 4) pointed out, augmenting the role of SDRs has been an official objective of IMF members since 1978. According to the second amendment to the IMF’s Article of Agreements, members shall conduct their policies with respect to reserve assets consistent with:

“...the objectives of promoting better international surveillance of international liquidity and making the special drawing right [SDR] the principal reserve asset in the international monetary system.”
(Article VIII.7).

6.1 SDR accounting

Fundamental to comprehending the accounting of SDRs is to understand that they are created when the IMF allocates them to member countries according to their quotas. For the member states, the accounting of SDRs resembles receiving a new loan, i.e. a balance sheet extension: In the national accounts of a country, the new allocation is added as a new entry on the asset book, and as a new liability on the creditor account. Therefore, just allocating new SDRs does not change the wealth position of countries.

In order to comprehend the interest scheme for SDRs, it is important to understand a specific feature of SDR accounting that again resembles the account-

ing of a loan: When a country actually exercises the option constituted by SDRs, it exchanges assets in its asset book, i.e. it replaces SDRs by currencies. This leaves the liability side untouched, where the allocated SDRs remain on record.

Interest on SDRs is calculated according to the gross positions of a country, i.e. for the allocated SDRs on the liability side and the actual holdings in the asset book, respectively. The same rate applies. If a country holds SDRs according to its initial allocation, zero net interest payments result; if it holds fewer SDRs than allocated, it pays interest to the IMF; if it holds more SDRs than allocated, it receives interest from the IMF (Galicia-Escotto, 2005; IMF, 2012).

The interest rate is calculated on a weekly basis as a weighted average of representative interest rates on short-term debt in the money markets of the SDR basket currencies, i.e. US dollar, euro, pound sterling, and yen (IMF, 2013a). If a country executed a part of its options (i.e. used SDRs to receive US dollars, euros, pounds sterling, or yen) and thus holds fewer SDRs than allocated, this effectively translates into a currency loan given at the interest rate prevailing in the money markets of those currencies. For countries that pay high rates of interest for borrowing, this typically translates into a beneficial deal because they obtain a long-term loan – even if they have limited creditworthiness – at the short-term interest rate of the most creditworthy countries (Williamson, 2009a, 3).

It is a remarkable historical detail that it took more than a generation to develop technically sound rules for dealing with SDRs in national accounting. This process was completed in 2008, when the United Nations Statistical Commission and the IMF's Committee on Balance of Payments Statistics endorsed the System of National Accounts (SNA) and the sixth edition of the *Balance of Payments and International Investment Position Manual* (BPM6), respectively.

Initially, the fundamental rules of double entry accounting did not apply to SDRs. SDRs were treated as assets in the asset book, but there was no match-

ing liability in the national accounts. For a financial asset that was supposed to play a considerable role in international finance, this was a remarkable feature. As an intermediate step, the *Monetary and Financial Statistics Manual (MFSM)* of 2000 treated allocated SDRs as “shares and other equities.”

With BPM6, new allocations of SDRs to participants in the IMF SDR Department are recorded as increases in gross reserve assets (holdings of SDRs), and in long-term debt liabilities of the authorities (allocations of SDRs). The main changes in the treatment of SDRs under the updated standards are the recognition of the SDR allocation as a long-term debt liability, and to record transactions in both assets and liabilities rather than valuation adjustments to international investment positions, when there are new allocations of SDRs. (IMF, 2012).

6.2 The current use of SDRs

Only countries and international organizations use SDRs. There are three ways of obtaining SDRs: The first is when the IMF generally allocates SDRs to member countries proportional to their IMF quota. The second is when the IMF asks a member country to exchange currencies for SDRs held by another member country after that other country has decided to execute the option provided by its SDRs. Any member country is obliged to perform such operations up to double its allocation with SDRs. The third method is when countries voluntary make bilateral arrangements.

General allocations are not made on a regular basis and have only occurred sporadically. Decisions on general allocations are made for successive basic periods of up to five years, although general SDR allocations have been made only three times. The first allocation was for a total of SDR 9.3 billion, distributed in 1970 – 72, and the second SDR allocation (12.1 billion) was distributed in 1979 – 81, resulting in cumulative SDR allocations of SDR 21.4 billion. To help mitigate the effects of the recent financial crisis, a third general SDR allocation of SDR 161.2 billion was made on 28 August 2009. Separately, the

¹⁵ The formally correct unit, using the ISO 4217 currency code, would be USD/XDR. For the convenience of reading, we use the abbreviation SDR instead of XDR throughout this text.

Fourth Amendment to the Articles of Agreement became effective on 10 August 2009 and provided for a special one-time allocation of SDR 21.5 billion. The purpose of the Fourth Amendment was to enable all IMF members to participate in the SDR system on an equitable basis, and to correct for a situation where countries that joined the IMF after 1981 (more than one-fifth of the current IMF membership) never received an SDR allocation until 2009. The 2009 general and special SDR allocations together raised total cumulative SDR allocations to about SDR 204 billion (IMF, 2013a). This represents approximately 2.8 percent of official foreign exchange reserves of 10,936 trillion USD as per the end of 2012 (IMF, 2013b).

6.3 A major social innovation

Developing SDRs into an international reserve currency would be a major social innovation. This can be seen by considering three related challenges.

Kenen (2010a) reminds us that, often, the notions of *reserve currency* and *reserve asset* are used synonymously, which they are *not*. States' currency reserves are actually held in the form of reserve assets, the most common of which are interest-yielding US government bonds. Gold, as the traditional reserve asset, is not treated as a currency – at least not since the end of Bretton Woods. Additionally, SDRs are neither a reserve currency nor reserve asset – at least not in the strict sense; they are assets, but of a specific variety, i.e. options; the very reserve currency, with which a state can pay for trade or debt, is only acquired when the options are executed.

Currencies issued by national governments share the special feature that each government requires its citizens and companies to use its own specific currency to pay their domestic taxes. An international reserve *currency* would be one that could be used internationally to pay debt, but would not be “empowered” via the legal compulsion to use it for paying taxes. In no way do we wish to dismiss the attempts to deliver this innovation; rather we aim to add a further argument for why it would indeed be as bold a move as Zhou indicated (in the interest of fairness, it should be mentioned that this argument also applies to Keynes' original Bancor).

The second challenge concerns a crucial aspect of SDRs – that their execution *unconditionally* is at the discretion of their holder. It is exactly this unconditionality that makes SDRs special and distinct from the ordinary drawing rights of IMF members. As long as SDRs comprise only a small fraction of global reserve holdings, this unconditionality is not a problem. Wyplosz (2010, 10) pointed out that their unconditionality would become a serious problem if they developed into a major reserve asset, because they would become, de facto, primary liabilities of the US authorities. Wyplosz found it difficult to imagine that the US would accept such unconditionality and not require some form of veto power; otherwise, the US would not agree to SDRs developing into a major reserve asset. If, however, the veto power was granted, SDRs would no longer be unconditional options, which might render them unattractive.

The third challenge concerns the fact that often explicitly, but generally implicitly, reserve currencies are treated as *public goods*. Contributing to establishing and maintaining an international reserve currency involves costs. Kenen (2010a, 2010b) discussed the costs of maintaining the financial integrity of an SDR reserve regime, which were found to be substantial. This framing of the problem constitutes a *social dilemma*: Even if constituting and maintaining an SDR reserve currency is beneficial to everyone, it is even more beneficial to enjoy the benefits when others pay for them. Social dilemmas, however, typically give rise to *burden-sharing* exercises: Negotiations concerning who contributes what share of the costs of a public good regularly become cumbersome experiences that are prone to failure. The negotiations on creating a so-called substitution account for scaling up SDR operation between 1978 and 1980 were no exception, and failed over disagreements about how to share the burden of exchange rate risks (Helleiner, 2010, 5; Gowa, 1984; Boughton, 2001, 936 – 943).

International climate negotiations are a paradigmatic contemporary example of the burden of negotiating burden-sharing. There, too, the problem is framed as a social dilemma. Jaeger et al. (2012) have suggested reframing such problems as a *coordination challenge* rather than as a social dilemma. They argue that it is both more appropriate and more convenient to

understand typical global problems as challenges of coordination. The idea that this is more appropriate is rooted both in the game-theoretic and economic bases of the relevant problems. The suggestion that it is more convenient relates to the prospect of transforming a cumbersome burden-sharing exercise into a joint search for win-win strategies.

We find it remarkable that Zhou explicitly stated that the process of developing SDRs towards an international reserve currency “should be a gradual process that yields win-win results for all.” For us, this clearly indicates Zhou’s awareness of the difficulties and challenges involved in framing this process as a burden-sharing exercise. Instead, Zhou prefers to frame it as a coordination exercise. We hope that this choice reverberates in both the scientific and policy discussions concerning the prospects of, and potential routes for, developing SDRs into a future international reserve currency.

Moving from the present SDRs to a global currency would entail a long process, possibly punctuated by major crises. The purpose of the present paper is neither to plan such a process nor to suggest specific measures to be undertaken by the relevant institutions. Its goal is more modest: inviting decision makers, scholars, and the interested public to consider and debate the need and possibility of developing a sustainable architecture for the global monetary system. Engaging with Governor Zhou’s proposal might be a good way to start.

6.4 A possible first step

In chapter 2.4, we listed Governor Zhou’s proposals for developing SDRs towards an international reserve currency. We think that one item in this list particularly qualifies for a first step: the suggestion to use SDRs as unit of account, and to denominate financial assets in SDRs. This is similar to the practice of the 1990s, when bonds defined in ECUs were established.

A first reason for choosing this item is that it would not require changing the rules of the IMF. Currently, only governments can use SDRs as options to access currency loans. In contrast, all parties who are prepared to issue a bond are free to use SDRs as unit of account to define the value of this bond and the related interest payments.

A second reason for our choice is that we have specific financial assets in mind that could be denominated in SDRs: bonds for financing investment in European energy infrastructure.

One possibility would be to denominate *project bonds* for financing European infrastructure investments in SDRs, which would be issued by private investors.

In 2012, the pilot phase of the *EU-EIB Project Bond Initiative* was established.¹⁶ It aims to revive and expand capital markets in order to finance large European infrastructure projects in the fields of transport, energy, and information technology. This is to be achieved by enhancing the credit standing of private entities that need to raise private funds for the infrastructure projects they promote (EU Commission, 2013).¹⁷

Alternatively, if one did not wish to involve the EIB, any European energy infrastructure investor would be free to finance its investments by issuing bonds denominated in special drawing rights. Straightforward candidates would be transmission operators or merchant investors. Merchant investors are private companies that are not regulated and try to build business cases by using and equilibrating price differences between national energy markets. They thus work towards the European goal of establishing single, joint European energy markets. To give an idea about possible tangible investment objects, we want to mention cross-border interconnectors in the European electricity and natural gas grids. Interconnectors in the electricity grid will play an important role in the long-distance transmission that is necessary to utilize a high proportion of renewably generated electricity within a future European SuperSmart Grid.¹⁸

¹⁶ Established by Regulation No. 670/2012, published in the Official Journal L 204/1 of 31/07/2012.

¹⁷ This is fundamentally different from the idea of the so-called “Eurobonds” or “Stability Bonds,” i.e. the joint issuance of bonds to provide general funding for Member States’ government funding needs.

¹⁸ For the SuperSmart Grid, cf. Battaglini et al. (2009).

Likewise, interconnectors in the European natural gas grids will be crucial for the security of gas supply, which is key to operating gasfired power stations that are able to back-up the intermittent supply of renewable electricity.

A third reason for our proposal is that we want to suggest a possible first step that would gain wide visibility beyond the community of currency experts, and could trigger a dialogue between various players in both Europe and China.

The fourth and final reason for the proposed first step is that we have chosen to follow Eisenhower's famous advice: "If a problem cannot be solved, enlarge it." Eisen-

hower, we presume, would have chosen to combine the quest for a sustainable financial system with that for a sustainable energy system. Invoking once again the Chinese metaphor of crossing a river, the first step that we propose would be to simultaneously cross *two* rivers: The river of a sustainable financial system and that of a sustainable energy system. For us, this represents a promising first step in a long journey of social learning. ■

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