

The dollar and the Transition to Sustainable Development: From Key Currency to Multilateralism

Michel Aglietta & Virginie Coudert

Summary

Drastic changes in US politics relative to international agreements and to bilateral relationships with China raise a political question about the key currency status of the dollar and a theoretical question in international monetary economics: Can a key currency system be maintained if the issuing country deliberately engages in conflicting protectionist policy?

This policy brief investigates how the positions of major currencies have been changing in the international monetary system for several years. The key currency relies on the acceptance of the issuing country as a benevolent hegemon that delivers an economic policy conducive to international financial stability. Until recently, it appeared that, despite the relative shrinking of the US weight in the world economy, the dollar had maintained its dominance both in international payments and in official reserves. However, uncertainty in US policy is disrupting risk perception in heavily dollar-indebted emerging and developing countries. Besides, denying the services of international transactions for non-US-resident firms with countries under US embargo is a serious encroachment on the key currency system.

In the long run, the forces that can transform the international monetary system (IMS) stem from the transformation of the growth regime under environmental constraints. Since its genesis in the industrial revolution, the key currency has been the currency of the country dominating the primary energy resource, *e.g.* the commodity most traded worldwide. The pound sterling was linked with UK dominance in coal, the dollar with US dominance in oil.

The irremediable shift to renewables, required to moderate climate change, will shift the growth regime to dispersed sources of renewable energy. The developing countries have inadequate financial resources to undertake the needy investments. Second, the positions of countries in terms of energy dependence will be reshuffled.

A multilateral financial system, mixing public and private financial institutions, will require the cooperation of major countries to channel saving from all parts of the world to finance those investments. Here we argue that a multilateral monetary system would be more adapted to these challenges than the present one. It would fulfill the basic functions of international money in providing an ultimate reserve asset that will be the debt of no country, an SDR-based IMS. The last section of the paper explains the transition from dollar to SDR reserve.



1. Is the dollar still the core of the international monetary system?

The 2008 crisis came from a well-identified epicenter, the United States, and rapidly spread all over the world. This rapid propagation was clearly due to financial globalization, since the world's large financial institutions had all bought or exposed themselves to more or less the same US toxic assets. However, beyond these concrete linkages, one may wonder if such a violent spillover of financial turmoil in the country that issues the major reserve currency challenges the international monetary system itself (IMS). Indeed, the central position of the United States in this system has long been denounced as a factor of asymmetry between countries, and this criticism still applies nowadays.

1.1. The legacy of history

Nearly fifty years after the end of the Bretton Woods (BW) system, the international monetary system still holds the same flaws that triggered its collapse in 1973. Its underlying structure is asymmetric and strongly biased in favor of the dollar, despite major changes in the world economy. In some ways, the famous Triffin dilemma still applies (Obstfeld, 2011). As stated in 1961, it predicted the failure

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of the BW system for one of two opposite reasons. On the one hand, the US would accumulate large external deficits to meet the world's liquidity needs in dollars, leading to an accumulation of dollar reserves worldwide that greatly surpassed the US stock of gold. Hence, a suspension

of gold convertibility could occur. On the other hand, the US would stick to a balanced current account, making the stock of dollars available to non-residents insufficient to accompany global growth. In 2019, the situation is not very different as most central banks' forex reserves are still held in dollars, and invested in Treasury bills, perceived as the top international safe assets. Therefore, either the US keeps accumulating huge public debt to provide the world with large amounts of Treasury bills, which is an unsustainable scenario in the long term, or the world might run short of international liquid assets, giving rise to a devastating rise in interest rates.

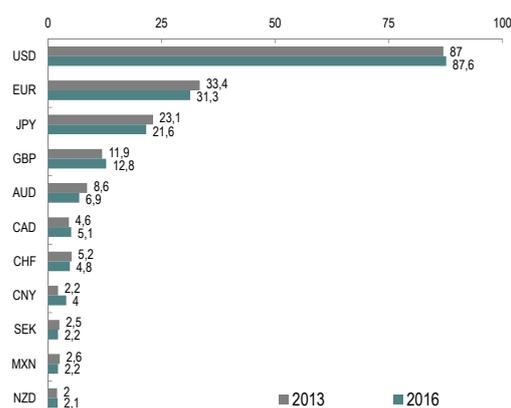
The persistence of this dilemma raises the question of the lingering predominance of the dollar, despite the obvious drawbacks for the international monetary system and the world economy. This could be due to the inertia of network effects in the demand for currencies. The US geopolitical predominance and its military links with a number of countries explain a large part of the dollar use in many countries (Eichengreen *et al.*, 2018). Furthermore, as of now, there is clearly a shortage of immediate challengers to the dollar. The euro crisis has thwarted the advance of the euro as an international currency (Coeuré, 2019) and the internationalization of the renminbi, however rapid, is still in its early stages.

Besides, the US may be reluctant to let go the substantial advantages provided by issuing the major international currency. The first benefit comes from seigniorage stemming from the purchase of dollars by foreign central banks for their official foreign exchange reserves as a precautionary measure. Those purchases have largely contributed to the financing of the US current account deficit since the 1980s. This is a painless source of financing, as central banks that need to increase their dollar reserves are not particularly demanding about the return of these USD assets. The second advantage is the cheaper borrowing cost abroad, as foreign central banks and other institutional creditors are often less fussy about the return of their investment in USD. However, this advantage may be not so prevalent in the world environment of low interest rates. Thirdly, the US can be inward-looking in running its monetary policy, as long as it is immune from the feedback on its own economy of its impact abroad.

1.2. Comparison with the other major currencies

Indeed, the two most usual indicators of currency internationalization show only slight changes in the internationalization of currencies. The dollar even slightly increased its share on the forex market over the last three years (Figure 1). It was involved in 88% of foreign exchange transactions in 2016, at the time of the latest BIS triennial survey, against 87% in the previous survey in 2013. The share of the euro slightly decreased during this period from 33% to 31%, while that of the renminbi surged from 2% to 4%.

Figure 1 – Percentage of transactions on the forex market (sum = 200%)



Source: BIS BIS survey, 2017.

Regarding the composition of official foreign exchange reserves, the USD share apparently decreased from 66% in 2015 to 62% in 2018 relative to the world reserves allocated by currency in the IMF's statistics (Table 1). However, these figures are difficult to interpret because the share of the reserves allocated by currency itself increased from 59% to 90% in the total world reserves in the meantime, as more countries were willing to communicate the composition of their reserves to the IMF. Consequently, the observed

Table 1 – World currency composition of official exchange rate reserves (in %)

	2015Q1	2016Q1	2017Q1	2018Q1	2018Q2
Shares of Allocated Reserves	59.00	71.08	81.06	89.64	91.65
• U.S. dollars	66.00	65.46	64.68	62.47	62.25
• Euros	20.02	19.55	19.28	20.40	20.26
• Chinese renminbi			1.07	1.40	1.84
• Japanese yen	3.83	3.68	4.54	4.82	4.97
• Pounds sterling	3.83	4.63	4.27	4.68	4.48
Shares of Unallocated Reserves	41.00	28.92	18.94	10.36	8.35

Source: IMF.

slide in the dollar share can be due either to an actual decrease, or just to the fact that the previously unallocated reserves already contained less dollars, but this was not accounted for in earlier data. Regarding the euro, its share in world reserves has been quite stable since 2015, at around 20%. The rising share of the renminbi, which reached 1.8% in 2018 from 0% in 2016, mainly compensates for the decline of the dollar; the Japanese yen and the British pound also increased their shares, though to a lesser extent.

What are the stakes for the two main challenging currencies, the euro and the renminbi? Concerning the euro, we have to recognize its lack of progression on the international scene. This mainly results from it being the currency of a monetary union, lacking all the attributes of a complete currency. The euro crisis has shown the flaws in the governance of the monetary union. One major concern is the euro area public debt not being a fungible asset that is able to play the role of a safe asset. Worse, five out of eight member countries lost their AAA status during the last crisis, so that the AAA sovereign debt issued by the euro area is now only 10% of GDP (Coëuré, 2019). This situation undermines the credibility of the euro for foreign investors as an alternative to the dollar.

At the launch of the euro, there was no political will to internationalize the new currency. Indeed, the creation of the single currency proceeded from a Franco-German political compromise. In the deal, German authorities accepted abandoning the Deutschmark (DM) on the condition that the euro would be managed like the DM. This explains many aspects of the common monetary policy, such as the inflation-adverse stance and, at the international level, the initial reluctance to let the currency internationalize.

The recent communication released by the European Commission is clearly departing from this initial stance, as it recognizes the advantages of issuing an international currency for the euro area, as well as the benefits of a multipolar international monetary system for the world economy (European Commission, 2018). The Commission proposals include a number of steps, such as the development of the banking union and the capital market union. Creating a large pool of euro-area safe assets is also pointed out as a necessary condition. This could be satisfied, for example, by the

launch of sovereign bond-backed securities (SBBSs), as proposed by the European Systemic Risk Board (ESRB, 2018). The SBBSs proposal consists of pooling the euro-area debt in different tranches of risk to target various types of risk-averse investors. In this configuration, the senior tranche would be considered as a European safe asset, whereas the other tranches could be sold as more risky assets to risk-aware investors searching for yield.

Regarding the renminbi, its internationalization has rapidly progressed in a number of aspects, beyond its surge in the forex transactions and its new presence in the central banks' forex reserves mentioned above. First, joining the Special Drawing Rights (SDRs) basket of currency in 2016 certainly

established its official status as one of the five major international currencies, along with the dollar, the euro, the Japanese yen and the British pound. Second, the increased Chinese presence in Africa and the Middle East may enhance international payments in renminbi for Asian trade with this continent. The progression is attested in the oil market where the setting-up of oil futures in renminbi is a significant step that is showing its development in primary

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commodity markets. Third, the payments and settlements in renminbi have been facilitated since the launch of China's cross-border inter-bank payment system (CIPS) in October 2015. Before that, the international payments in renminbi were settled, as for the other currencies, through the standard international system SWIFT (Society for Worldwide Interbank Financial Telecommunication), without SWIFT being able to recognize Chinese

characters. A decisive step was taken in 2016 when an agreement to connect the CIPS with the SWIFT international payment network was signed (Borst, 2016; Hakanes and Hynes, 2017). Since that time, the network of foreign banks taking part in CIPS has rapidly expanded, gaining participants from all areas in the world—Asia, North America and Europe.

1.3. Spillover effects of the US monetary policy in the emerging countries

Nowadays, the still dominant role of the dollar entails spillover effects of US monetary policy all over the world, and especially in emerging market countries. The rise in US interest rates resulting from the exit from non-conventional monetary policy makes investments in other countries comparatively less attractive, by raising the returns on US bonds. The consequential downward pressures on emerging market currencies may trigger crises. Although the large forex reserves that many emerging market countries have hoarded for the last two decades can dampen the risk of a global crisis, investors

may focus their attacks on some weak links. Asset managers, as well as end-investors, may also react to the mounting yields in the US by channeling less funds to emerging countries. This could engineer capital outflows at risky times.

2. Contradictions between the status of key currency and US policy

2.1. Theoretical requirements and consequences

An efficient international monetary system should provide a dual mechanism of monetary regulation. It should supply international liquidity in types of currencies and amounts that feed the needs of financing and settling international transactions of all kinds. International prices and therefore exchange rates should adjust in ways to foster mutual gains to exchange.

In a globalized world, financial transactions amount to many times the value of trade. Without capital controls, adjustment or non-adjustment depends on the debt-induced momentum in the prices of marketable assets shaping the global financial cycle. The latter is driven by the variations in liquidity preference that expresses the collective attitude to uncertainty of financial actors. It follows that, in the real world where uncertainty precludes the efficiency of finance, a working IMS cannot exist under financial globalization without a single safe asset, providing the basis for the determination of asset prices. In a world deprived of multilateral agreement on an ultimate multilateral safe asset – e.g. an asset not issued as the debt of any country – the solution has been power relations at the root of the key currency.

How can a key currency spread over time?

The nation state issuing the key currency should be a benevolent hegemon in providing the services of international liquidity, so that other countries gain advantages in their acceptance of the key currency that outweigh the disadvantages of their subservience. A key currency system cannot achieve the first best in the absence of a universal safe asset that is not the counterpart of the debt of any country, as Mundell demonstrated (Mundell, 1961). The symmetry provided in a multilateral system based on a common safe asset is lacking. It is impossible to achieve the stability of fixed exchange rates, the leeway of free capital flows and the full autonomy of economic policy. Divergences always arise. Different governments can choose different arbitrages. This is why a key currency system evolves over time. When a key currency becomes no longer appropriate, like the gold sterling system in the 1930s, some adverse consequences have to be faced. The immediate consequence in such circumstances is deglobalization (Rodrik, 2012). International relations get fragmented, capital controls are raised, trade wanes, and, with the lack of international liquidity, international finance unfolds.

It is likely that the foundations of the dollar system have already eroded, like those of sterling in the 1920s. The evidence displayed in Section 1 shows that the financial supremacy of the dollar persists almost unabated, but the dominance of the US economy worldwide is shrinking markedly. Arvind Subramanian has computed an index of global economic weight of countries, combining their shares of the world aggregates in GDP, in international trade and in net export of capital.¹ In 1973 after the demise of Bretton Woods, the weight of the US was 18% compared to 7% for Germany and for Japan. The predominance of the US was still strong, and all the more so given that the other economically powerful countries were entirely under US political and military influence. In 2010, the weight of the US fell to 14%, Japan was still at 6%, but the share of China surged to 12%. In 2020, the US will stay put at 14%, while the share of China will reach 15%.

We can also consider a more straightforward index: the weight of selected countries in world GDP. Here, we take GDP in current USD and also in purchasing power parity (PPP). The share of a given country in the world GDP in current USD can give a straightforward insight into its weight in the financial system, while that in PPP GDP shows its weight in terms of production of goods and services, by applying the same scale of prices across countries. While both measures are worth considering, the latter seems preferable in a long-run perspective for two reasons: (i) The measures in USD are submitted to the hazard of fluctuations in the USD exchange rate, which can blur long-term evolutions; (ii) the figures in PPP are more forward-looking when it comes to measuring the economic power of a country because, in the long run, prices tend to rise in emerging countries through the Balassa-Samuelson effect; hence their USD shares are expected to rise up to the PPP share under this effect.

The first striking feature is the surge of the emerging and developing economies during the latest decades.

Their relative GDP soared from 24% in 1980 to 40% in current USD 2018, while that of the advanced economies dropped by the same magnitude (Table 2.) The shift of power is much more pronounced when considering the PPP GDP, as the emerging and developing economies climbed from 37% to 59% of world GDP from 1980 to 2018. The share of the US declined from 22% to 15% in terms of PPP. The downward trend was also significant for the European Union and Japan. Meanwhile, China's GDP surged from 2% to 19% of world PPP GDP, and India from 2 to 8%. In terms of PPP GDP, China has now clearly taken the lead in world production.

Moreover, China does not belong to the US political and military sphere, to say the least. Furthermore, the gap is likely to widen in the next decade because potential growth is expected to decelerate in China to 2030, but will stay well ahead of the US, and the export of capital will rise with the implementation of the Belt and Road Initiative (BRI) project and other Chinese foreign investments.

(1) Arvind Subramanian (2011), *Eclipse: Living in the Shadow of China's Economic Dominance*, Peterson Institute for International Economics, September, chap.2, quantification and validation of economic dominance.

Table 2 – Share of each country/region in the world GDP measured in PPP (in %)

	1980		2000		2010		2018	
	USD	PPD	USD	PPD	USD	PPD	USD	PPD
Advanced Economies	75.8	63,2	79.1	56,8	65,5	46,3	60.3	40,8
United States	25.6	21.6	30.3	20.5	22.7	16.8	24.2	15.2
European Union	34.1	29.9	26.4	23.6	25.8	18.9	22.1	16.3
(Germany)	7.6	6.6	5.8	4.9	5.2	3.7	4.7	3.2
Japan	9.9	7.9	14.4	6.8	8.6	5.0	5.9	4.2
Emerging and developing countries	24.2	36.8	20.9	43.2	34.5	53.7	39.7	59.2
China	2.7	2.3	3.6	7.4	9.2	13.9	15.8	18.7
India	1.7	2.9	1.4	4.2	2.6	5.9	3.2	7.7

Note: USD : in current USD; PPP : in purchasing power parity.
Source: IMF, WEO.

Some observers may argue that the problem lies in the eventual changeover from the dollar to the yuan as the key currency, assuming that the key currency system is to last forever, provided that the world economy remains globalized. Indeed, the key currency system has been relevant for the last two centuries, but this may end because of the deep transformations of this century. Our civilization faces formidable environmental challenges, and a shift to true multilateral IMS could facilitate the necessary transformations. However, before venturing into the long-run processes that might generate a multilateral IMS, let us consider the deterioration of the world order under the influence of the present US presidency.

2.2. Can a key currency system be maintained if the issuing country deliberately engages in conflicting protectionist policy?

Money is not a commodity. Debts are cleared and settled, making payments final through the payment system, which is a public good. The dollar payment system extends worldwide, providing extra territorial powers to the government of the issuing country. The US exercises these extraterritorial powers in the field of monetary policy (US monetary policy is unilateral and pursues strictly domestic objectives), but also, increasingly, through the dollar payment system. Hence, the US government forbids both US and third-country residents to engage in dollar transactions with countries under US embargo. This is an outright denial of the free-trade rules that the key currency is supposed to promote and regulate for the wellbeing of all traders worldwide.

Unilateral US embargos happened several times in the past, even after the Soviet Union had been dismantled, to the detriment of Cuba for more than half a century and, more recently, Sudan. The main current case focuses on the embargo against Iran after Trump decided to withdraw from the 2015 nuclear agreement. The US government has

banned the use of the dollar for non-US entities wanting to buy Iranian oil, while the oil market is entirely processed in dollars. Such encroachment on the services of international liquidity is a restriction in the universality of the key currency system that would trigger devices to circumvent the embargo. Britain, France and Germany have been trying to set up a financial mechanism to help Iran continue to export oil to Europe, though Iranian exports would still decrease markedly to 1m barrels a day against a peak of 2.8m in early 2017. The three European governments

provide an umbrella to support SMEs, which do not have interest in the US, to help Iran sell crude. The transactions occur through intermediaries in Iran, who are allowed to buy barrels of oil through a domestic energy exchange.

The trade war deliberately engaged in by the US against China is a direct violation of free trade, in outright contradiction of the purpose of the key currency payment system, which is common acceptance under the auspices of a benevolent hegemon. As Jeffrey Sachs (2018) points out, the trade war is just a means to a much more dangerous end: trying to contain China's economic development. It is reminiscent of the pre-World War I rivalries between the great powers. Even if the tit-for-tat struggle is mitigated by a fragile agreement in 2019, the US struggle to hamper the "made in China 2025" industrial plan will continue—and probably worsen.

According to detailed analysis by Natixis, tariffs are not targeted at trade *per se* to reduce the bilateral deficit. One range of tariffs focuses on high-end exports with a view to containing China's technological advance (Natixis, 2018). Another range of tariffs is targeted at China's middle-tech exports with the purpose of reducing Chinese participation in global value chains. Furthermore, the US offensive goes beyond a "trade war". The blockage of Chinese mergers and acquisitions (M&As) in the US high-end industrial sector may be considered as a hostile step, although this may be comprehensible in the light of strategic issues and the lack of reciprocity in Chinese counterparts. The US government can also use fiscal tools to discourage US multinationals from investing directly in China despite the attraction of the huge Chinese consumer market. The massive reduction in US corporate tax has triggered retaliation, with the Chinese government offering corporate tax exemption to foreign companies (Natixis, 2018). The impact on international trade, both direct and indirect via the pass-through on export and import prices and the price elasticity of demand in both the US and Chinese markets and in third-party markets, would be limited in the worst-case scenario of

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no agreement on 3% of China's exports and 1.3% of US exports. However, the actions to stifle foreign direct investments will impinge badly on expectations in an international economy fragmented by protectionism. In such circumstances, the political conflict will shift to the search for alliances by both US and China that may lead to strategic rivalries between the main powers, as happened in the early years of the XXth century.

In Asia, China is emphasizing the urgency of concluding negotiations on the regional Comprehensive Economic Partnership (RCEP). The US is counteracting with the Indo-pacific alliance, supported by Japan. The other crucial objective for China is a bilateral

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investment agreement with the EU to weaken EU dependency on the US concerning some future priorities, primarily the implementation of the 2015 Paris Agreement on climate change.

These maneuvers will drag the conflict into the realm of the largely opposite models of globalization that the US and China are promoting. Therefore,

the future of the multilateral order is at stake. Before dealing with this subject, it is appropriate to touch on the downside risks assailing the world economy

2.3. Surge in US public debt and withdrawal of Russian and Chinese central banks from the US bond market

According to the Treasury Board Advisory Committee, the US will have to issue \$12trn worth of bonds in the next ten years. The debt load in percentage of GDP will reach the level that it rose to during World War II. In wartime, the Roosevelt administration appealed to patriotism so as to incentivize households to support the war effort. How will domestic savers offset the withdrawals of official non-residents in the next decade? Disinvesting dollar reserves and liabilities is already happening in Russia and in China. Russian authorities have claimed their will to de-dollarize. In 2018, the Russian central bank acquired 274 tons of gold financed by sales of US Treasury bonds. Meanwhile, the World Gold Council stated that gold purchases by central banks had bounced 74% in 2018. The UK did not yield to US pressure on London and has now become the main clearing center for the renminbi outside Greater China, supplanting Singapore (Szalay, 2019).

Reporting data from the SAFE (State Administration of Foreign Exchange), Natixis China Banking Monitor 2018 reported that the growth of foreign liabilities in US\$ (y-o-y) slowed down markedly in 2017, to 10% compared to 70% in 2016 – much more than the foreign liabilities in other currencies. In the same time-span, the allocation of central bank reserves of emerging market economies (EMEs) in renminbi increased by 80% from Q3 2017 to Q3 2018. This monetary rebalancing is compatible with qualitative information on the progress in Asian integration and the move to China's self-sufficiency in digital technologies.

3. From short to long term: the driving forces toward a multilateral order

3.1. A pronounced slowdown in China would have marked consequences worldwide

Many people still view China as just another emerging market economy (EME). This is a strategic error. The country has reached the status of a great power. In 2018, China accounted for 19% of the global economy in PPP, as mentioned above, and 30% of worldwide growth in the period 2011-18. A number of foreign firms now depend heavily on the huge Chinese consumer market. The worst scenario to fear is a severe slowdown in China combined with an American macroeconomic policy that is widening the twin deficits, while pretending to suppress them via protectionism.

Structurally, the new era of economic development in China will be the transition from capital-intensive growth to innovation-intensive growth. Such a transition implies a slowdown in potential growth, presumably to the range of 4% to 5% before 2030. Indeed, the huge capital accumulation from the beginning of the century to 2015 generated a powerful rise in labor productivity, amplified by the large migration of people from the countryside to cities in an epoch of a widening labor force. However, keeping this growth regime after the 2008 financial crisis required a tremendous increase in indebtedness, up to 270% of total debt/GDP.

Innovation-intensive growth will essentially depend on a total factor productivity (TFP) source of growth. To generate high-end innovation, a larger part of investment must go to higher education, R&D and cognitive networks to incentivize startups. This type of investment is not directly linked to labor productivity in the production of commodities, but it will raise total factor productivity continuously in the long run. Then, keeping the working population expanding will require social policies to allow the continuous migration of rural people to cities, with access to the social rights there. Moreover, women's participation will have to rise, and the retirement age to move forward, as in advanced countries. The combination of advancing to frontier technology, granting social rights to migrant workers, upgrading the skills of the labor force and lengthening the working life, to match the increase in life expectancy and health improvements, can reasonably achieve a steady slowdown in growth over the next decade without rupture.

However, there are challenges ahead. The high level of debt in the household sector, in both mortgage and credit-card expansion, is a drag on the propensity to consume. In business, the high debt of private firms, especially in real estate, weighs on the incentive to invest. Therefore, the government must strike a delicate balance between the risk of a slump in aggregate demand and the risk of surging debt defaults. The possible disruptions are impinging on the cyclical dimension of growth, aggravated by the trade war. The government will have recourse to direct administrative measures in favor of SMEs and tax reduction and subsidies for households, coupled with some calibrated relaxing in monetary policy.

Much depends on the outcome of China's policy in the short run because of its impact on EMEs and developing countries. This

group accounted for 59% of world GDP in 2018 as against 37% in 1980. According to the IMF (2018b), many countries in this group are financially vulnerable. They could be affected by a slowdown in China, but also by gyrations in the dollar and rises in US interest rates. Turkey, Venezuela and South Africa, on top of Argentina and Pakistan, would have difficulties in serving their dollar debt if their exchange rates plummet. The IMF highlights growth-at-risk because the degradation of financial conditions in those countries and the higher volatility in equity markets cannot be offset by the limited freedom in the monetary policies of advanced economies, while the US is overextended in fiscal policy and the euro zone is paralyzed by its inability to coordinate. Since both public and private debt is much higher than in 2008 worldwide, there is a danger of a sudden rise in risk aversion, triggering sweeping adjustments in investors' portfolios. The financial conditions look less likely to engineer a global financial crisis, but the political setting has deteriorated to a much greater extent. It can lead to radical uncertainty.

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3.2. From short to long term: a multilateral system to handle global public goods

The IPCC (2018) report leaves no ambiguity: the window of opportunity for limiting the world to 2°C warming or less is closing. It is a global public good that can only be produced by collective action. Scaling up low-carbon investment worldwide is the only way to achieve it. Developing countries need to do this more but have less financial means to do so. Therefore, advanced countries need to extend their financial scope much farther than the limits of their own nations. Indeed, according to Dasgupta *et al.* (2018), in order to implement a climate finance initiative, advocated by IPCC in its 2018 report, the amount of redirected investment required would lie between \$0.73 and \$1.3 trillion yearly until 2035, with two-thirds investing in emerging and developing countries. To achieve this goal, an overhaul of the international financial system is required, away from the shareholder value principle.

The international payment system is another public good, organized as a key currency system in the two eras following the industrial revolution: the sterling gold standard in the age of classical capitalism up to 1913, and the dollar standard in the Bretton Woods system. Their key currency functions have persisted, albeit in a degraded way: sterling in the 1920s and the dollar after the demise of Bretton Woods. The ability to maintain the key currency system has been strongly related to dominance over the universal source of energy used in the production system of each era: the UK over coal in the industrial revolution of the 19th century, the US over oil after World War II (Mitchell, 2011).

This pattern is not surprising. The dominant source of energy linked to a specific growth regime is the most traded commodity worldwide. This commodity is traded at a world price denominated in the key currency. Therefore, it is the anchor of the international

price system. Exporting countries recycle revenues for investment in the most secure financial system—that of the country issuing the key currency. It follows from both processes that the international payment system, which is the fulcrum of currency dominance, is linked to the payment system of the country issuing the key currency. The money used to trade it plays the pivotal role in international payments. This is why it is possible to argue that

the international monetary system was a coal sterling system from 1821 to 1913 and an oil dollar system in the Bretton Woods era from 1944 to 1973. After the demise of Bretton Woods, the nationalization of primary resources and the creation of OPEC, the price of oil became the focus of confrontations, and its volatility has a large impact on the dollar (Coudert and Mignon, 2008, 2016), leading to the delinking of many oil-importing countries from the dollar. However, nothing has changed in the currency denomination of the oil price and the payment mechanism of oil transactions

because of the massive externality of demand that is what makes a payment system resilient.

However, let us consider the energy requirements in the 21st century to establish a sustainable growth regime capable of saving the wellbeing of future generations over time. What is being slowly recognized as the Anthropocene, and could be more accurately labelled the Capitalocene, is an irreversible transformation of the geological history of the planet. Until very recently, despite the repeated warnings in the United Nations Framework Convention on Climate Change (UNFCCC), economists and politicians alike were lacking any serious appraisal of the challenge. What should be understood is that the Anthropocene is a point of no return in evolution. Humans have to survive in the new geological environment. They will have to stabilize the earth system, under the unknown planetary limits, through developing new and viable modes of production and consumption. Who can reasonably argue that the challenge ahead is compatible with the American way of life that is still the linchpin of globalization?

In energy production, coal and oil should become stranded assets. The primary sources of energy should be renewables in the decades ahead. Contrary to coal and oil, renewables are multiple and local sources. What can be transported worldwide is electricity. China has taken the lead in building electricity networks through its Global Energy Interconnection Initiative (as reported in the *Financial Times*, June 8, 2018). The purpose is to create the first global electricity grid, thanks to the technological breakthrough in ultrahigh-voltage cable technology that allows power to be commercially transported over vast distances at lower costs. It can be done via linkages between networks to allow a cross-regional allocation of power surpluses worldwide. This geopolitical strategy is a grand design on a par with the Belt and Road Initiative (BRI). The ambition is huge, but commensurable with China's organizational, technological and financial firepower. The China Electricity Council, which reports directly to the State Council, the highest governing body, coordinates companies involved in this grand design.

Considering the tight link observed historically between the international payment system and the organization of energy production and distribution worldwide, we should at a minimum assume that the shift to renewables might also give way to a new international monetary system, if multilateralism is to be preserved. At least, it is an important topic that merits study. This policy brief modestly sets up some preliminaries to such research.

An important assumption to study is that the era of key currencies that have lasted about two centuries will come to an end with the end of the political denial of the Anthropocene. The IMS will not rely on a key currency because of the diversity and multiplicity of investments in energy production, distribution networks, energy efficiency and transport infrastructures in a large number of developing countries. The international financial system must be enabled to reallocate world savings to the necessary investments over many years. To achieve this, a multilateral payment system seems a more appropriate organization.

In the era of key currencies, the anchor was the money price of the primary source of energy. In the new ecological era, it will be the social price of mitigation action, *i.e.* the tutelary price required to undertake massive, long and risky investments. The social price of mitigation action is a notional price used in computing prospective returns to offset the negative impact of the discount rate on long-term and risky investments (World Bank, 2017).

This price cannot be a market price. It will express what a collective is ready to pay in order to restore an ecosystem of common interest. It can only be the outcome of social choice through a political process. Climate change was defined at the Paris conference as a global but differentiated common good. According to the Paris Agreement, countries must embody their intended mitigation actions in their strategic policies for sustainable development. They are incentivized to mobilize the financial sector for low-carbon investment. To do this in the most effective manner, it has been suggested that the gap between the private and social return of mitigation actions can be overcome by valuing them to generate new carbon assets. Each country can do this on its own for a five-year period and be accountable for the results.

The types of investments necessary to transform the production systems all over the world are plagued with long duration and high upfront costs, and depend on technologies with scale and network effects. Those investments have social returns much higher than their private financial returns. The gap precludes attracting investors who think in terms of shareholder value. Long-term investors to be mobilized are public investment banks and “responsible” institutional investors with long-maturity liabilities. They are deemed responsible because they understand that their asset portfolio must match the long maturity of their liabilities. To extend institutional finance into the developing world, public guarantees issued by a large collective of sovereigns of advanced countries must help cover the risks (Dasgupta *et al.*, 2018). The social price of mitigation action can be the benchmark for allocating the guarantees to selected projects. The money value of this benchmark will be linked to an international currency, as the price of coal and later the price of oil were linked to the key currencies of their respective eras.

3.3. An IMS based on the SDR as the ultimate reserve asset

The Special Drawing Rights (SDRs) were created in 1968 to avoid the drawbacks of the key currency system. The SDR was intended to be the ultimate reserve asset managed by the IMF. The failure to carry out the reform of Bretton Woods in 1972-74 opened the way to financial globalization deprived of monetary rules, allowing the capture of financial linkages by international investment banks. The Jamaica Accords validated the *ad hoc* private financial system in 1976, but brought back the dollar-dominated IMS deprived of monetary rules, leading to the return of financial cycles and their associated financial crises, as in the 1920s.

After the systemic financial crisis of 2008, the central banks of convertible currency countries had to deal with international liquidity in emergency through the dollar swap network that was not a truly international lender of last resort, but only a selective one. In 2009, the governor of the central bank of China officially pleaded for a multilateral system based on the SDR. In 2011, the Palais Royal Initiative advocated international reform, recommending a multipolar

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system with the IMF playing the role of the international lender of last resort and the SDR the ultimate reserve asset. The rationale was clear: the rise of large powers out of political dependence on the US raises the problem of the historical evolution of the IMS towards a complete multilateral system incorporating a reserve asset common to all countries.

The changeover from the semi-dollar system to an SDR-based system involves a substitution account. Central banks and governments holding a surplus of dollars, above what is needed in a rational management of reserves, would deposit excess dollars in a substitution account, in a specific department of the IMF, against claims on the Fund denominated in SDR. Such assets in SDR would lead to all convertible currencies transferring SDRs to other IMF members against their own currencies (see the accounting mechanism in the Appendix). The administrators of the substitution account can hedge the foreign exchange risk supported by the account by diversifying dollar assets to reconstitute the basket of currencies composing the SDR. Periodic issues of SDRs, decided by the IMF's executive committee, can then enhance the reserve position of the SDR. This system, likely to suffice in normal times, could be supplemented with emergency issues in cases of liquidity crises. Central banks would be able to transfer any convertible currency against SDRs both ways to manage their stock of SDRs without any need to use dollars.

Obviously, to reach an equitable distribution of the ultimate reserve asset, the Bretton Woods system of quotas must be repealed.

Instead, a gradual increase of SDR reserves in proportion to world GDP growth would allow a smooth adjustment of international liquidity, leading to replacing the key currency system forever. An SDR-based IMS would be established, with the consolidation of the endogenously created SDRs with the original ones proceeding from the substitution account.

How can the multilateral payment system support the low-carbon investment drive? One possibility is to create Trust Funds in which unused SDRs could be invested to finance the guaranteed low-carbon

investment program. A more ambitious method consists of SDR

loans to national and international public development banks being pledged to finance the national intentions of carbon emission reductions under the Paris Agreement.

The IMF executive committee, with the backing of the United Nations which is responsible for the world environmental program, may agree to capitalize via SDR issuance a much larger Green Fund for developing countries. It would build on the heritage of the Keynes/Kaldor proposal on a commodity-based currency, by adapting it to the mitigation of climate change instead of

the stabilization of commodities.

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Appendix: SDR Accounting

Mechanism of the substitution account

The SDRs created appear as a liability of the special department of the IMF as counterparts of the deposits in SDRs in the different central banks. In central bank accounting, SDRs are reserve assets as counterparts of liabilities toward the SDR department of the IMF.

Country A's central bank CBA		Country B's central bank CBB		IMF SDR Account	
Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
				Deposit in CBA	SDR
SDR	Deposit from IMF SDR account	SDR	Deposit from IMF SDR account	Deposit in CBB	

Exchange of SDRs against national currencies between two central banks

Suppose that Country A's currency is not part of the SDR basket, contrary to that of Country B. Central bank A sells SDRs to buy currency B. Central bank B increases its stock of SDR assets transferred by A in issuing its own currency as a counterpart of the SDRs transferred by A.

Country A's central bank CBA		Country B's central bank CBB		IMF SDR Account	
Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
Deposit in CBB		Additional holdings of SDR	Deposit from CBA		
SDR	Deposit from IMF SDR account	SDR	Deposit from IMF SDR account	Deposit in CBA	SDR

About the authors

Michel Aglietta is Advisoir at CEPII and France Stratégie, Emeritus Professor of Economic Sciences at the University of Paris Nanterre.

Virginie Coudert is Scientific Advisor at the Banque of France, visiting Professor at the University of Paris Ouest Nanterre La Défense and a Research Associate at the CEPII.

Contact: michel.aglietta@cepii.fr - virginie.coudert@banque-france.fr



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Editorial Director: Sébastien Jean
Managing Editor: Christophe Destais
Production: Laure Boivin

CEPII
20, avenue de Ségur
TSA 10726
75334 Paris Cedex 07

+33 1 53 68 55 00
www.cepii.fr

Press contact: presse@cepii.fr
