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Sovereign Wealth Funds in the mutation of global finance

Michel Aglietta

University of Paris Nanterre and Cepii

Abstract

Sovereign wealth funds (SWFs) started making the headlines in the midst of the global financial crisis. They were welcome neither by academics nor by politicians of Western countries. In a flurry of 2008 papers they were peremptory told what they should do and what they shouldn't do. The reasoning underlying the prescriptive norms was flawed in two respects. First it equated SWFs to any other institutional investors. Second it advocated models of asset allocation based upon the efficient market hypothesis, while the global financial system was crumbling!

The present paper takes a radically different view. It shows precisely how SWF balance sheets are interconnected with the balance sheets of the public sector of the nation whose wealth they transfer over time. Therefore they are strategic actors by their very nature. Their objectives, which shape their asset liability management, participate to the long-run policy of their nation. Their business model is framed on the integration of their asset liability management into the national political framework.

Their governance cannot abstract from the broader environment, which has been upset by the transformation of the world economy. The financial crisis has invalidated the Wall Street paradigm of market finance, intermediated by global investment banks to finance long-term investment worldwide. The retrenchment of European banks in cross-border lending enhances the role of public finance in emerging market economies. Meanwhile the catching up process, which has been reaching more and more developing countries calls for huge amounts of real investments. It is why a regime shift in finance is under way, which gives prominence to public investors. The last part of the paper shows how public private collaboration is arranged in China to finance SMEs through private equity funds.

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Introduction: earlier Western prejudices against Sovereign Wealth Funds

In 2007-08 sovereign wealth funds (farther on SWFs) came to the limelight, triggering a flurry of papers in the academic community. SWFs surged both in number and size of assets under management, reaching \$3.05trns in 2008 according to the first Preqin Review. This rise to prominence was due to the commodity price super cycle and the so-called global imbalances of the mid 2000's. It immediately caused alarm in both the academic community and the political establishment of Western countries.

Since that time SWFs have developed and they have been accepted in the community of institutional investors. Their total amount of assets under management has reached \$5.38trns in 2013, a gain of \$750bns in additional assets since 2012. They have grown with creations (ex. Western Australian Future Fund created in December 2012), net capital allocations by the sovereigns and their profitable investments.

In 2008 academic papers were not much interested in understanding what SWFs were all about, how they were legitimate, what their intent was and how their governance was structured. Most of them took a normative view, pretending that SWFs should behave like ordinary financial investors in an efficient market. They should be denied any strategic behavior and have no other purpose than maximizing financial wealth through optimal diversification.

Furthermore this uproar arose in the depth of the financial crisis without any connection in the papers. The psychological shock occurred in late 2007 when SWFs entered the capital of the finest Wall Street investment banking firms in distress. Suddenly the arrogant tycoons in the nirvana of financial capitalism felt threatened in their hegemony. Something had to be done.

Academics working as financial advisors were called upon to build defensive arguments that would deprive the intruders of controlling rights. What should be done and what should not be done were spelled out without any hint on the financial crisis, though it was invalidating the efficient market hypothesis that allegedly justified the normative predicament the authors wanted to impose. Meanwhile political pressures by US Congress was taken by the government and backed by the European Commission to negotiate a code a good conduct that could be acceptable by both parties. Indeed, in a financial climate praising free capital movements, targeted discriminations against SWFs that might limit their freedom to invest would be a bad signal indeed.

In April 2008 the Washington-located Peterson Institute issued a blueprint for SWFs best practices that was a compendium of a priori prejudices and that has a peculiar flavor while the financial crisis was mounting to its apex 5 months later. To justify its recommendations the Peterson Institute raised 5 major "concerns".

-First, governments may mismanage international investments. Presumably the private sector always invests optimally. It was bluntly asserted in the midst of the subprime crisis!

-Second, governments may manage their investments in pursuit of political objectives. Presumably the "extravagant privilege" of dollar status financing cheaply the purchase of assets everywhere in the world is not a strategic behavior!

-Third, SWF owners may use the funds to promote financial protectionism in host countries against interests of the financial community as a whole. This is a logical conclusion stemming from the dogma stating that allocations under free capital market are always optimal.

-Fourth, SWFs may contribute to market turmoil and uncertainty. Remember that this was raised after Bear Stearns's failure and at the time when the mortgage credit market was deteriorating fast and leading Fannie Mae and Freddie Mac to bankruptcy!

-Fifth, conflicts of interests might arise in principal agent relationships. This is absolutely general in finance. Why should it give rise to specific restrictions against SWFs?

However the concerns, as alarming as they might be, had problems to be transformed into actual guidelines. It was left to the IMF and OECD to define loose codes of good conduct for SWF managers on the one hand and for recipient countries of SWF investments on the other hand. After a round of meetings between the concerned parties, the IMF issued Generally Accepted Principles and Practices (GAPP) in the fall of 2008. They were supposed to work as a voluntary code of conduct. Meanwhile the OECD was trying to define a code of good conduct for recipient countries. This is a very general and vague statement. Host governments remained free to attach any meaning that suited them for "essential security interests". Without common definition of national interest and no procedure to resolve disputes the matter was left out of international law.

There are good reasons why the issue was left indeterminate. The views summed up in the 5 concerns reveal the paranoia that seized upon Western policy makers and politicians at the time (BJ Cohen, 2008). SWFs have bad reputation in the West just because they are vehicles of a shift in wealth worldwide against the predominance of the West, and also because they herald a redistribution of the wealth from the private to the public sector. Those are the telluric forces that are reshaping the world economy and that must be understood prior to define the nature of SWFs and their future development. They are objective processes that make SWFs entrenched and inescapable entities in the realm of international financial investment (Xu Yi-Chong and Bahgat eds., 2010).

These prolegomena announce the structure of the paper. In the second section the reasons why the business model of SWFs is not the same as the ones of other institutional investors, even if they have common features, are depicted. In the third section it will be explained that the financial crisis has invalidated the efficient market hypothesis that underpins the principles of portfolio management. In the fourth section it will be argued that the way financial globalization has developed in the three decades leading to the financial crisis is receding. An overhaul of financial globalization is under way to respond to the needs of massive long-term investments in which SWFs might play a prominent role. The objectives and techniques of a new model of finance suitable to the needs and responsibilities of long-term investors will be sketched. The fifth section will point out how SWFs and other long-term investors might prosper in the new pattern of world growth. It will take issue upon financing innovation in emerging market countries and redeploying production structures to sustainable growth with the example of China. Finally the sixth section will conclude.

The business model of sovereign funds

Long-term investors are not all types of investors which pretend to be so. They have in common not to be constrained by unforeseen liquidity needs. It makes it easier than other financial intermediaries to hold illiquid or less liquid assets. However it is not enough. The benchmark of long-term investors is the liability side. All long-term investors indulge in asset liability management (ALM). Defined-benefit pension funds and insurance companies are

long-term institutional investors because they have fiduciary duties on their contractual liabilities towards their individual customers, which are legal. Their long-term objective is a long-term real return high enough to immunize their contractual liabilities (to be able to pay the contractual flow of income over the life of the contract). Therefore the motive of those investors is pecuniary.

SWFs are not the same type of investors, neither are endowment university funds, nor government reserve funds, nor family offices. All those institutions are perpetual funds. Therefore they are long-term investors in principle. They are distinct from one another by their liabilities. What are the liabilities of SWFs? They are liabilities to the nation through the sovereign institutions of the country, most often the government. The wealth in the balance sheets of SWFs is owned by governments. It follows that people who pretend that SWFs should invest on strictly pecuniary motives get astray. Like all long-term investors, SWFs are established to transfer wealth from the present to the future. But unlike contractual investors, their liabilities must be understood more broadly. *They participate to the sustainability of the public finances of the nation over time.* They are linked to the budget of the government through two-way transfers: feeding the revenue of the government and getting capital inflow from the government. Therefore it is absurd to pretend that SWFs should not resort to strategic actions. *They are strategic by their very nature.*

In accounting terms, the balance sheets of SWFs are connected to the balance sheets of the public sector of the nation. In those dual balance sheets, some items are contingent claims and liabilities. This line of thinking departs from traditional portfolio diversification methodology applied mechanically to SWFs (see M. Brière and Z. Bodie, “*sovereign wealth funds and risk management*”, 2011, for a first theoretical analysis and application to Chile). The linkage between public sector and SWF accounting can be drawn up the following way (table 1).

Governments have multiple and changing objectives over time. They react to innumerable and unexpected number of shocks and social tensions. Therefore they maximize nothing. However, for the state not to fail, the government must keep its public finance sustainable. The condition is that the net wealth of the public sector does not decrease over time, if wealth is to be transferred to the future so that the welfare of the whole population increases. This condition must be satisfied by overall macroeconomic policy. Depending on the relation between the growth rate (g) and the average real interest rate paid on the gross public debt (r), the government has the leeway to run a primary deficit (if $r-g < 0$) or must generate a primary surplus (if $r-g > 0$).

It is where SWFs enter the picture. They are agents of governments. Therefore they do not have an independent preference function. *They should try to achieve a long-run risk-adjusted real return $> r$* , so that governments have reason to transfer revenue to SWFs in order to increase their capital. The objective is to get revenue from the SWF in the future higher than the taxes the government can expect to collect, had not it transferred capital to the SWF in the beginning.

The long-run equilibrium benchmark of SWFs being well-defined *for a given fiscal policy* of the government, two questions arise to define the business model comprehensively. Upstream, what are the political relationships between governments and SWFs, so that the business model of the latter is legitimate to the population? Downstream, what is the method of ALM appropriate for SWFs? Let us start with the latter.

Table 1. Government and SWF accounts

Items	Government		SWF	
	Assets	Liabilities	Assets	Liabilities
Fiscal assets and liabilities	Net present value of future taxes + transfers from SWFs	Net present value of future primary expenditures (incl transfers to SWFs)	Net present value of future transfers from the government	Net present value of future transfers to the budget
Financial assets and liabilities	Equity capital in SOEs Other financial assets	Gross public debt	Equities Bonds Alternative financial assets	Borrowing to financial intermediaries
Real assets and public wealth	Real Estate assets	Net wealth of the public sector	Real assets directly held	Net wealth of SWF
	Total	Total	Total	Total

- *Diversity of sovereign wealth funds*

There are different types of sovereign wealth funds depending on the nature of the resources that are transferred to them. Investment strategies depend on those liabilities. Some SWFs are only foreign exchange reserve funds set up for stabilization purpose. They play the part of stabilization departments of central banks. They submit to liquidity constraints. Others like China Investment Corporation (CIC) get their resources from excess FX reserves. The stabilization function of the currency is done by the SAFE (foreign exchange department of the Peoples's Bank of China). The CIC has the mission to invest mainly abroad and to take risk in order to get higher return than a stabilization fund. It is interesting to observe how the CIC has reacted to the financial crisis.

The CIC was created in 2007 with a first allocation of \$200bns. In 2012 it got \$150bns more. The total asset under management end-2012 was \$482bns. The CIC is a holding company with two branches managing two different types of funds: The first branch invests Yuan-denominated funds that add up to the allocation of capital from foreign exchange. They come from assets held by the State in financial institutions. Their management is delegated to the Bank of China (BOC). The second branch is the CIC per se. It invests offshore in foreign currencies. The CIC aims at high returns on investment $\geq 10\%$, but not high-risk so that it can expect relatively steady long-term return.

Until mid-2011 the CIC invested mainly in financial institutions. It is how it suffered heavy losses form equity investment in Blackstone and Morgan Stanley in the early days of the financial crisis. In the last two years it has diversified in three domains: energy, infrastructures and new technologies. In energy the CIC has the mission to contribute to the security of

supply of the country in energy (nuclear and renewable on top of oil and gas) and minerals. In new technologies it targets companies that are in later stages of development close or in commercialization, not early stages of R&D projects. Geographically the CIC has retreated largely from the US in favor of a core business in Asia to participate to the goal of East Asian integration. Other areas of activity are central Asia and Asia Pacific (Australia and Indonesia). In Europe the CIC is active in distress Southern Europe countries, buying back long-term public debt and investing in infrastructure. Finally some funds are strictly sovereign pension funds. They manage reserves held by government-run public pension funds where assets are ear-marked for payment of current and future retiree benefits. It can be an intentionally-funded pension scheme (ex. National Pension reserve Fund of Ireland) or a transitory reserve fund (ex. French Fonds de Réserve des retraites).

Most SWFs are set up from natural resources in countries exposed to unpredictable revenues due to unexpected primary commodity changes. Because international insurance markets are quite incomplete, self-insurance is the most rational choice for producer countries (Mitchell and alii, 2008). Therefore oil-exporting countries have set up SWFs from already a very long time in some countries. Kuwait investment Authority exists from 1953, Abu Dhabi Investment Authority from 1976, Norway Government Pension Fund-Global from 1990. All of them and many others aim at converting flows of revenue from exhaustible natural resources into diversified assets that will be able to sustain streams of income in the long run for future generations. This rationale is also the same for non-commodity SWFs like the two Singaporean funds: Temasek holdings set up in 1974 and Government of Singapore Investment Corporation in 1981. Both have got their capital from the transfer of persistent fiscal surpluses due to the high national saving. On top of the long-term goal of intergenerational equity, this type of SWFs can promote fiscal stability in transferring profits to the government in times of low tax receipts due to downturns in the economic cycle.

In Norway integration with the budget is quite institutionalized. The long-term target real return is 4%. (Ang, 2010). This benchmark gives guidance to how much the government should spend the proceeds generated by the Fund. The proper amount is transferred to the general budget. Spending rules should be flexible to get ready to meet large unexpected shocks that might arise.

ALM is not often explicitly displayed and discussed. Portfolio management goals are not usually linked to obligation streams. However investment risks must be controlled along with expected economic costs of providing the promised future income or explicitly promised pensions. What can be said about best practices?

- *Asset-liability management principles for sovereign wealth funds*

The background model for ALM proceeds from Sharpe and Tint (1990). The basic principle is the following: liabilities of institutional investors, either contractual from individual saving or transferred from the government as collective saving, are negative assets for the institutional investor. Conversely any alternative asset, yielding a quasi-rent and bearing extra-financial risks, is equivalent to a negative debt.

The diversifiable portfolio must be allocated by the institutional investor so as to hedge the risks of the liability side and to offset the extra-financial risks invested in alternative assets in order to optimize its net wealth, or at least keep it sustainable over time. Liabilities with *positive* covariance with assets are ipso facto *a debt hedging the asset*. Because liabilities rest on social commitments for pension funds or commitments towards the sovereign for SWFs,

the discretion to manage lies in the asset side. The asset portfolio must be managed to hedge the liabilities. Therefore the optimal portfolio, admitting that it exists, or at least the most satisficing portfolio is quite apart the portfolio that one might have gotten without the positive or negative correlation between assets and liabilities.

Posit A the total value of assets and L the one of liabilities, meaning the net present value of future expected payments to the government. $S=A-kL$ is the surplus if k is the weight the fund manager grants to the likelihood to make future payments on her liabilities. $k=1$ is the full optimization of the surplus. $k=0$ is a standard management that does not take care of the liability side. $T=0$ is the present, $t=1$ is the future. The random future values are pinpointed under the symbol \sim . The program of the fund manager is:

$$Max\tilde{S}_1 \approx Max\left\{\frac{\tilde{A}_1}{A_0} - k\frac{L_0}{A_0}\frac{\tilde{L}_1}{L_0}\right\}$$

Define the yields on assets and the cost of liabilities: $1 + \tilde{R}_A = \frac{\tilde{A}_1}{A_0}$ and $1 + \tilde{R}_L = \frac{\tilde{L}_1}{L_0}$, so that

$$\text{the surplus is: } \tilde{Z} = \tilde{R}_A - k\frac{L_0}{A_0}\tilde{R}_L$$

Let us suppose that the manager uses a standard utility function: $MaxU = Max\{E_0(\tilde{Z}) - V(a\tilde{Z})\}$. Retaining only the terms that influence the allocation of assets (the manager has no control on its liabilities and the commitments they encapsulate), the program is finally the following:

$$Max\left\{E_0(\tilde{R}_A) - aV(\tilde{R}_A) + 2ak\frac{L_0}{A_0}\text{cov}(\tilde{R}_A, \tilde{R}_L)\right\}$$

The first term in brackets is the standard risk/variance model. The second term is the hedging of liability risks. It is effective if the covariance between the return in assets and the cost of liabilities is >0 . The higher the covariance, the more robust is the portfolio in immunizing the liabilities. On the contrary if assets are chosen so that the covariance is <0 , the portfolio is unstable because the value of the surplus diminishes as long as liabilities increase.

Notice that the model applies to alternative assets because non-diversifiable alternative assets are akin to liabilities. Let us be G the uncertain value of alternative assets. They are valued either in-house or by specialized experts. Depending on how the diversifiable portfolio is structured, G makes the hedging of a negative debt or an excess risk (SUR). At $t=0$ the excess risk is: $SUR = 2ak\frac{G_0}{A_0}\text{cov}(\tilde{R}_A, \tilde{R}_G)$. It is an excess risk premium that must be deduced from

the expected risk of the diversifiable portfolio (a mix of shares and tradable bonds) to compute the contribution of the portfolio to the global welfare which the SWF participates to.

With the same notation as above, the program is:

$$Max\left\{E_0(\tilde{R}_A) - aV(\tilde{R}_A) - 2ak\frac{G_0}{A_0}\text{cov}(\tilde{R}_A, \tilde{R}_G)\right\}$$

What proportion of marketed equities the investor must hold in its diversifiable portfolio when she invests in alternative assets. Posit γ her relative risk aversion. The stochastic return

on equities has an expected yield μ and a standard deviation σ . The alternative asset has stochastic characteristics r_g , σ_g and σ_{gw} for the covariance with the tradable portfolio. Because alternative assets are negative debts, equities can be a hedge if $\sigma_{gw} < 0$. Finally $\rho = W/G$ is the reverse of the share of alternative asset value in total wealth. The optimal proportion of equities in the optimal tradable portfolio at time t is:

$\lambda_t = \frac{1}{\rho} \left(\frac{\mu + \frac{\sigma_w^2}{2}}{\gamma \sigma_w^2} \right) + \left(1 - \frac{1}{\rho} \right) \frac{\sigma_{gw}}{\sigma_w^2}$. The proportion of bonds is $1 - \lambda_t$. The portfolio is entirely determined.

The interesting conclusion is that alternative assets come first. The optimal allocation can be determined only if the variance of the bundle of alternative assets and the covariance with tradable assets are computable and make sense as estimations of risk. Usually those conditions are not satisfied. However long-run real investments are fundamental determinants of catching up and convergence in emerging market economies (EMEs). The non-financial risk characteristics of those assets are non-Gaussian and largely non-computable. They belong to what Keynes calls uncertainty. It is why theorists using the Markowitz framework are deadly wrong in applying it to sovereign wealth funds whose concern with alternative assets is the primary focus. Therefore the question that is impossible to bypass is: what to do practically? Are there workable guidelines?

The first immeasurable risk is the risk of illiquidity of alternative assets. It can be mitigated or at least bearable for investors with small liquidity needs in proportion of the size of their assets. However it makes SWFs unfit with financing startups, new SMEs in their developing stage or infrastructure projects in the building phase with promised streams of income far ahead in time. Public guarantees, technics of risk sharing and new financing instruments will be needed for their participation to investment drives via private equity firms (PE). If SWFs invest in hedge funds (HF) and PE funds, they indirectly bear the credit risk due to the usually high leverage of those shadow banks, on top of the illiquidity due to lock-in periods they impose on their investors. Investing in HF and PE funds expose SWFs to asymmetric bias (skewness) and thick tail of probability distributions (high kurtosis), risk profiles that SWF managers are not too often aware of.

The way to manage those intricate problems is to rely on governance in setting up a dual *core satellite structure*. The core must build up a portfolio to immunize the fund's liabilities the manager is committed to fulfill. The management must carefully assess the time profile of the liabilities and choose a portfolio of tradable assets that makes the most of a positive covariance with liabilities. Investment in alternative assets and imperfect hedging portfolio must be left to satellites accounts and financed by other sources of capital than the ones whose returns are committed to fiscal regulation. The dual structure makes it possible the build-up of *a time-flexible strategy*.

A time-flexible strategy should not be based on asset classes but on risk factors to focus as much as possible on the forces that drive the variations of risk premia. Indeed, assets are bundles of risk factors, both market and non-market risks. Factor analysis is more suitable for active management than market-weighted indexes relying on asset classes. The need to shift the focus increases with the importance of alternative assets. Because of externalities in the interdependencies in the structure of risks, as shown in the above model, risk factor analysis must be embedded in an integrated policy framework. However the governance can raise

difficult problems of accountability. It is why the business model must be completed by a higher level of political legitimacy toward the sovereign.

- *Integration of sovereign wealth funds into the national political framework*

The Norwegian government pension fund-global is one of the most successful in the world. Norway is the country that has made most explicit, not only its characteristics of portfolio building but also the principles of its governance. It is why it is good method to think from this experience (Ang, 2010). Governance and performance of the fund belong to the theory and practical considerations presented above. Those two dimensions are superseded by two more fundamental ones: legitimacy and integrated policy.

Quoting Ang, “legitimacy ensures that the capital the SWF is entrusted for is gradually disbursed across present and future generations”. SWFs are established in the public interest to eschew the mismanagement of national wealth. Natural resource wealth tends to provoke “Dutch disease” leading to unsustainability if the exhaustible wealth is not properly substituted into profitable sources of wealth in the long run. The quasi-rents from externalities can easily give rise to corruption and appropriation of wealth by vested interests. Lack of fiscal discipline can lead to runaway diversion of production capacities and inflationary pressures. To avoid such evils, legitimacy is paramount. It must ensure that the general public and the governing party or the authority whatever the political regime understand and support the purpose of the SWF. Therefore legitimacy is more than preserving capital. It allows SWFs to experience losses without being threatened in its existence.

To be maintained, legitimacy needs well-developed political institutions. The rule of law is necessary but not sufficient. Legitimacy must be rooted and sustained in society itself. Legitimacy can be established in countries of all political spectrums. For instance, it is well-established in Norway but also in Singapore. In Norway transparency helps setting clearly and simply the goals of the Fund because socially conscious people can understand the decision-making rules. The Ministry of Finance is directly responsible of the Fund and reporting to Parliament. The fund is managed by the Norges Bank Investment Management, a subdivision of the central bank. Delegation mandates to outside asset managers are few and confined to narrow equity investments in particular EMEs where specialized expertise is needed.

But transparency is neither necessary nor sufficient to achieve legitimacy. A few non-democratic countries (in the Western sense of the term) have set up legal, political and economic structures to ensure the longevity of the SWFs. It can be achieved if the entire system makes it hard for the governing authorities of the Fund to diverge from the original goals. In Singapore the performances of the funds are deliberately opaque for the financial markets. Published reports are rare and individual asset holdings are unknown. However the SWFs have deep support of the people and play a paramount role in the financial policy of the country. The principal agent relationship is very robust. Fund managers are responsible for their actions at every hierarchical level. They provide regular reporting to the governments and are supervised by an independent board gathering most senior politicians.

Legitimacy is comforted by an integrated policy framework that helps sustain the long-term nature of the Fund’s goals and its ability to transfer wealth over time. A well-designed institutional system makes it possible to define clearly the role of SWFs in the policy framework of the nation. SWFs are not SOEs, even when they hold their shares. They are not directly involved in the sectors in which the companies invest. Therefore they are not and they should not be majority investors tied to particular companies. Unfortunately this is often what

happens in the oil and gas industries. When their resources come from foreign exchange reserves, they should not be currency stabilizers. Replacing the central bank in this role would blur their long-term goals in getting involved in short-term arbitrages. More generally SWFs should not be direct tools of government policy. They contribute to the sustainability of the budget but should not be involved in political arbitrages over taxes and subsidies. According to Ang, if the fiscal transfer from SWF to the general budget is rule-based, it gives guidance about how much the government can spend the proceeds generated by the Fund. However spending rules may be made flexible enough to meet large unexpected shocks. The reasons for flexible rules are better understood, thus better accepted, in risk-factor investment strategies. It will avoid time-inconsistent policies giving rise to precipitous changes that are often ruinous.

As we have demonstrated above, the balance sheets of SWFs are complex and embody assets whose risks are generated by externalities that are not measurable in the standard risk-return model. This is why they are not assigned to pecuniary profit-maximizing benchmarks. They need a long-run target return. But, in the dual core satellite governance structure, they can choose non-profit maximization goals for part of their portfolios. Once more, what is crucial is the definition of their proper role in an integrated policy to sustain legitimacy.

At a lower level of governance, achieving inside efficiency in the organization of activities is all-important. It is why the expertise must be gathered in-house as much as possible. The selection of managers and the specification of performance benchmarks for them should be carefully supervised by the governing body of the Fund.

In the above review a holistic approach of SWF investment strategies has been advocated to achieve long-run equilibrium target return. Nothing has been said on the long run. However all financial investors and governments face a huge challenge. The post-financial crisis in the long run will not be the restoration of the past 30 years of global finance. A regime change is occurring in the world economy. It will dramatically impinge upon the types of investment, the way it will be financed, the organization of financial systems. How will SWFs adapt to the new world? It is what should be investigated in the next two sections.

Sovereign wealth funds and the financial cycle

One has already noticed that portfolio allocation is affected by financial market incompleteness and by externalities generated by alternative assets that induce correlations difficult to assess with tradable debt securities and equities. However long-term asset allocation is plagued with far deeper problems that may explain why there are so few long-term investors. Because risk factors are not independent over time, investors with long-term horizon are time dependent. Pitfalls in dynamic asset allocation ensue when risk factors are not independent and identically distributed over time (IID). How should strategic portfolios be structured and how should they evolve over time when the pattern of risks is not IID?

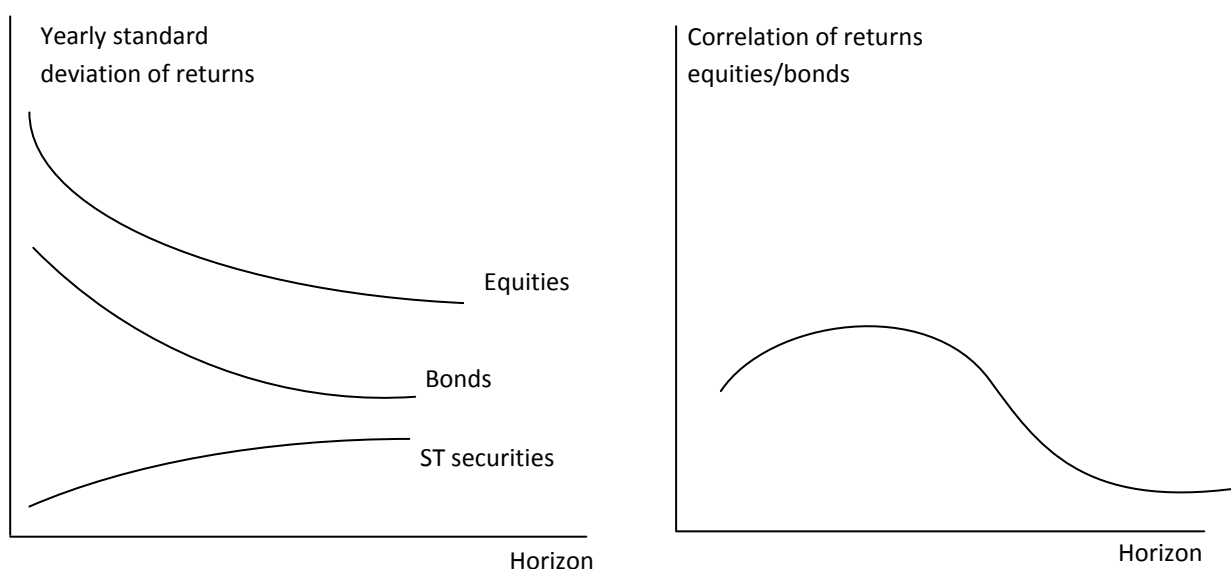
- *Mean reversion and the preference for risky assets*

The assumption drawn from the theory of efficient markets is the common knowledge of the fundamental values of assets. Fundamental values are supposed to be exterior to the markets, e.g. determined by real factors of productivity, consumer preference and demography. Therefore rational investors use them as benchmarks in a mean-reverting way. Mean reversion makes financial markets stable since stabilizing speculation is profitable. They can only be destabilized by real shocks on the determinants of the fundamental values, until

investors can figure out what is the new value. Following Campbell and Viceira (2005), it can be demonstrated that the optimal portfolio of investors with constant relative risk aversion is not buy-and-hold since risk factors are not IID. However it has a share of risky assets systematically higher than the portfolio of myopic investors. Indeed, the composition of SWFs is about 60% equities and 40% cash and debt instruments.

The fundamental reason is the following: *if mean-reversion is the dynamic law of markets, asset returns are less variable over longer horizons than over shorter ones*. Standard variations of equity and bond returns decrease over time, contrary to short-term securities. Furthermore the correlation between bonds and equities increases in the short run, but decreases in the long run (figure 1).

Figure 1. Volatility of asset returns and correlation between bond and equity returns as a function of the horizon



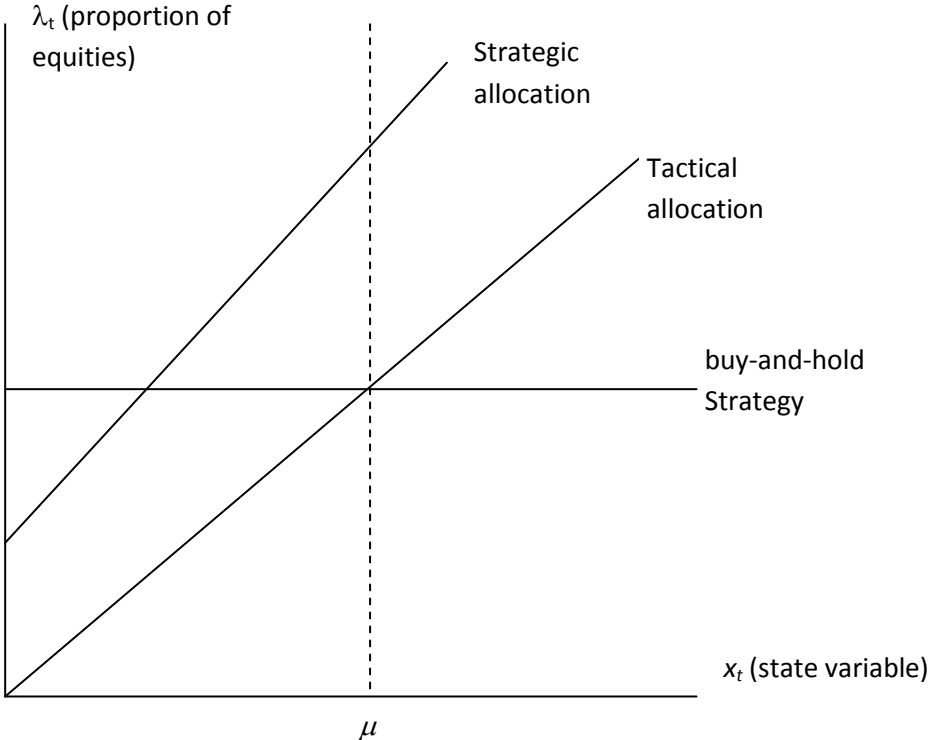
The reason of this pattern is clear. As the consequence of time dependency, the risk premium on risky assets is not only a function of the covariance of returns between these assets and the whole portfolio (as in a standard Markowitz model), but also of the covariance between the return of the risky asset and the revision of expectations on the future return of the portfolio. With mean-reversion the latter covariance is negative and allows for inter temporal hedging that long-term investors can build. Therefore the proportion of equities is systematically higher than the one for short-term investors (figure 2).

The tactical allocation is the one of a short-term investor who only observes the state variable x_t . If the yield is 0, there is no equity in the portfolio. If it is equal to the average yield μ , the allocation coincides with that of a buy-and-hold investor. The strategic investor makes allowance for the intertemporal hedging due to mean reversion. Consequently the proportion of equities is always higher. It is >0 even if $x_t=0$. It increases with x_t systematically faster than the tactical allocation (figure 2).

Everything in this theory depends on the exogenous assumption of a fundamental value logically prior to the working of the market, a “true value” that the market only reveals through asset trading. What happens if fundamental values do not exist? If instead of mean

reversion, markets are driven by momentum? If risk aversion is not an exogenous phenomenon but is endogenously determined by the momentum? Those questions arise from uncertainty that is evacuated from the efficient market hypothesis. This is the problem of the financial cycle, which impinges heavily on investors' behavior.

Figure 2. Proportion of equities in portfolio as a function of investment opportunities



- *The financial cycle and the macro economy*

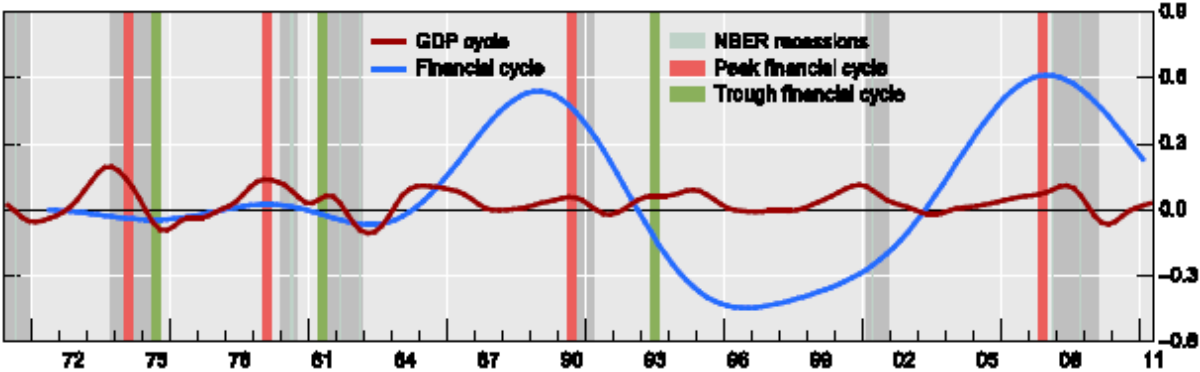
A key feature of financial dynamics under uncertainty is that momentum, not mean reversion, drives asset market prices. Momentum means that price trajectories over time proceed from self-reinforcing interactions between perceptions of waxing future values and diminishing risk aversion (Borio, 2012). Mean reversion is not embedded in investors' strategies. It arises as an historical phenomenon over financial cycles lasting 15 to 20 year through booms and busts ((figure 1). Because the financial cycle has a much longer time span than the decision-making horizon of both market participants and policy makers, it is beyond their ability to adjust to the nature of financial instability. It is why procyclicality is a key feature of macro dynamics. When dynamic is driven by momentum, imbalances accumulate in stocks of assets. Stock disequilibria persist in asset value/GDP and debt/GDP and impinge upon flow variables (net credit/GDP) both in the upward and downward phases of the financial cycle (figure 3).

The financial cycle is measured by the evolution of an index combining private credit growth, credit/GDP ratio and house price variations, the business cycle is measured by the variations of the output ratio. Both cycles differ widely in frequency (16 to 20 against 5 to 8 years) and

in magnitude. Because the financial cycle lasts much longer than the business cycle, there are unfinished recessions (like the 2001-02 recession occurring while the credit-induced asset price momentum is in full swing). This is the time for major errors in monetary policy. However one can see that the financial cycle was subdued in the era of the so-called financial repression. It means without surprise that the financial cycle depends on financial structures. The latter co-determine financial dynamics and monetary regimes.

In an era of financial repression (1960's and 1970's) the macro disequilibria inherent to capital accumulation show off in inflationary spirals and are dealt with quantitative monetary policy. The business cycle is larger in amplitude than the financial cycle, which is subdued. In an era of financial liberalization (1980's onwards), inflation is subdued and disequilibria accumulate in balance sheets and show off in magnified financial cycles. Standard monetarist doctrine loses pertinence entirely in the latter era. The so-called great moderation boasted by central bankers is the screen behind which they have left the financial momentum feeding on itself.

Figure 3. The financial and business cycles in the US



Source: Drehman and alii (2012)

The financial cycle is global while macro economic cycles are national. Therefore the disconnection over time in the span of both cycles is doubled by a disconnection over space (Rey, 2013). The momentum of the financial cycle drives the leverage of international banks, cross-border capital flows and the growth of credit. It moves asset prices and exchange rates. The double disconnection precludes financial markets from regulating macroeconomic disequilibria, unless the financial cycle is thwarted by capital controls abating the impact of financial globalization. It is what China has been doing successfully.

The magnitude of cumulative variations in the financial cycle is out of touch with the fluctuations in the output gap and with any real variable whatsoever. The turnaround in the momentum is not a mean-reverting process expected by financial market participants. It is a transition stage triggering a financial crisis. It is why BIS staff has insisted that financial crises are not exogenous shocks, they are booms gone busts. If the prior momentum in asset prices has been long and strong, because it has been fueled by fast and sustained credit growth, there is a high probability that the subsequent crisis turns systemic. It is obvious that this pattern is incompatible with the efficient market hypothesis. The paradigm must be changed, in which direction? What is the behavior of financial investors capable of giving rise to risk profiles so far away from the teachings of standard financial theory?

- *From efficient market hypothesis to intrinsic financial instability hypothesis*

The self-fulfilling dynamic in the expansive phase of the financial cycle is depicted on figure 4. One can see that all the dynamic relations are reinforcing the surge of asset prices. *There is no mean-reverting countervailing force capable of regulating asset valuation.* The market determines asset values through its one dynamic without any exogenous benchmark playing the role of an anchor. The average prices of assets are ex post historical means that are revealed over decades. Unless investors have a very long view, have no obligation to pay any income to their owners or can delay income service and bear unrealized losses for long periods of time in the downside phase of the business cycle, they will not be able to shape their strategies on those historical asset values. Therefore the question is: are SWFs candidates to be those very long-term investors? The Norwegian Pension Fund-Global boasts to have a 100-year horizon and to buy equities in the depth of the financial crisis purposely. I am not sure that the CIC and the UAE Fund managers who bought shares of US investment banks in the fall of 2007 did it with the financial cycle in mind!

Figure 4. Positive feedbacks in the upward phase of the financial cycle

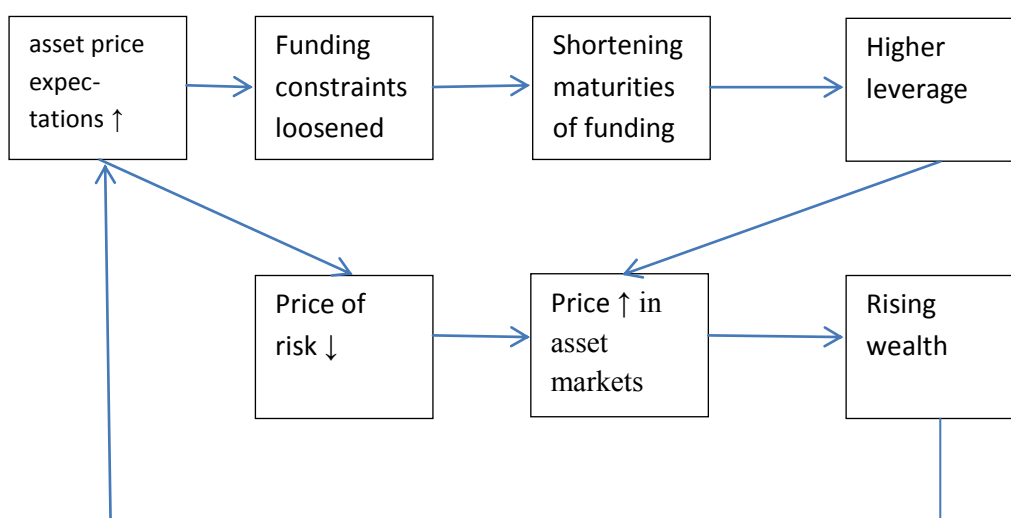


Figure 4 displays the logic of the momentum. It is driven by shadow banks (hedge funds and PE funds) and broker dealers that are financial market intermediaries. Long-term investors nurture the whole process in investing blindly in shadow banks and in delegating their bond and equity investments to outside managers. They magnify the momentum in fostering the competition between managers, based upon quarterly financial report. They are so far from long-term strategies!

Financial intermediaries borrow their funding in the wholesale money market against collaterals, which are the speculative assets themselves (Adrian and Shin, 2008). Because the value of their collateral appreciates in the momentum and because their funding horizon gets shorter as long as the dynamic of figure 4 is in full swing, shadow banks have interest to stay in the bubble. With mark-to-market valuation, market intermediaries are incentivized to increase their leverage to lend to all investors entering the asset markets because they are attracted by price appreciation. Therefore rising leverage, accelerated credit growth and asset price surge are closely linked.

Financial intermediaries use *value-at-risk* models that point out that risk is decreasing as long as the value of their collaterals increases faster than the value of their own liabilities. Therefore the distance to default looks higher with the accounting device and models that deal with risk as if it were IID. Financial intermediaries have all reasons to bid aggressively to extend more credit to investors and advise them to buy inflated assets. They lure investors with cheap credit since their risk control models teach them that risk is decreasing. It follows that credit spreads do not rise with the explosion of credit. Indeed, one of the most spectacular features of the huge credit expansion that financed the real estate bubble in years 2003 to 2006 was the shrinking in spreads! It was going to appear later as a gross undervaluation of risk when the price of risk jumps with the reversal in asset prices.

The theoretical analysis shows that risk accumulates in the euphoric stage of the financial cycle but stays hidden in vulnerabilities that are not accounted for: counterparty risk in obscure chains of over-the-counter risk transfers through conduits and special vehicles created by investment bankers to hide their true exposition, liquidity risk as much as the wholesale money market is financing longer maturity mismatches, credit risk that will get systemic while asset prices crash.

The question is now the following: since the market has no inbuilt stabilizer when it is enslaved into its momentous logic, who are the actors in the financial system with opposite interests and enough stamina to counter the dominance of international investment banks, so that the financial cycle can be moderated?

One possibility is the development of macro prudential policy to stem the buildup of financial vulnerabilities in standardizing derivatives markets, making central settlement compulsory and using countercyclical devices (variable capital requirements for systemic financial intermediaries, variable reserve requirements and liquidity ratios for banks, limits of loan-to-value and loan-to-income for non-financial borrowers in real estate markets).

Another possibility is the existence of a bunch of true long-term investors, large enough in aggregate size and not dependent on leverage themselves to exert countervailing power in financial markets. They should have in-house strong management in both asset allocation and risk control and ALM models based on risk factors. They should have a horizon long enough to see through the financial cycle. Can SWFs have incentives to transform their business models to exert discipline on their shadow bank partners and generate some mean-reverting forces in tradable markets? Surely not those that are focused on fiscal stabilization. They will hold large inventories of low-risk government debt. However they make no more than 10% of total assets of SWFs. Other types of SWFs can in principle finance more long-term real investments. Will they? To try answering this question, one must appraise the post-crisis transformations in financial globalization and the world economy.

Transformation of long-term finance and economic growth: the State is back

In its 2010 report “*shifting wealth*” and the 2012 update, OECD made an important contribution to understanding the transformations of the world economy. The report discards the fashionable dichotomy between advanced and emerging economies and the even more outdated North/South. In a problematic focusing on the long-run evolution of the wealth of nations, the report distinguishes 4 groups of countries: affluent/ converging/ struggling/ poor. Countries are converging if their growth rate is growing at least twice faster the average growth rate of affluent countries over 20 year-time. What distinguishes converging and

struggling countries is not the ability grow fast. It is macroeconomic robustness that eschews large macroeconomic fluctuations. It shows the shift in the distribution of wealth since 2000. The shift in wealth is an opportunity for the world economy. Most important for future growth drivers, shifting wealth is changing with the stages of Chinese reform.

The first stage of shifting wealth has triggered the notorious acceleration of world growth cum great advance in financial globalization and world trade. In 20 years up to 2008 world trade multiplied fourfold and trade between non-advanced countries tenfold. This epoch was driven by Chinese and Indian openings, which brought 1 billion people onto the world labor market, about 40% of the whole labor supply. Redeploying labor created the Chinese manufacturing basis that launched the commodity-intensive growth, which benefited resource-exporting countries in Africa, Middle East, Latin America, Australia and Canada.

The second stage of shifting wealth is linked to the first Lewis turning point in China, which provokes a trend growth in real wages and in the real exchange rate of the renminbi. The structural change in relative prices induces transformation in the capital structure towards investments in intangibles (human capital and R&D). This change in the supply side is matched by a rebalancing on the demand side from export-led growth to the domestic economy. Worldwide the middle class will double from 2 to 4 billion people between 2012 and 2025. It will support a massive urbanization drive that will shift the dynamic of consumption towards converging countries while some struggling countries will enter the more glamorous category. Urbanization preserving or restoring ecosystem services will require enormous investments in non-OECD countries. The World Bank estimates the needs to \$1 trillion per annum to 2020 (Chelsky and alii, June 2013). Those needs vastly outstrip available long-term financing. To meet the challenge an overhaul of the channels of financial intermediation is urgently needed.

- *Spreading vulnerabilities in post-crisis financial systems: retrenchment of European banks and need of a new business model in banking.*

The new financial landscape constraining the supply of finance in the long run proceeds from both the aftermath of the financial crisis and from broader trends. They are bank deleveraging and new prudential regulation, fiscal consolidation in affluent economies restraining public investment in infrastructure, research and education, the ageing of populations inducing institutional investors to shift to lower-risk assets, which increases the cost of equity.

The consequence of the financial crisis is the most spectacular because it has led to the fragmentation of the European financial system. European banks were used to borrow dollars on the wholesale money market via their US branches and subsidiaries and redistribute the liquidity worldwide. After the crisis bank vulnerabilities have provoked the retrenchment of European banks that used to make cross-border intermediation, which largely financed the foreign operations of EMEs. It has led to a void in the financing of investments in EMEs, not a small cause of the growth slowdown in non-OECD countries.

European banks suffer from depressed market valuation that makes raising capital on the Stock market costly or plainly impossible. It is due to excessive leverage, weak earnings and inadequate capital buffer. It should not be forgotten that doubling the Equity/Asset ratio from 2.5 to 5% lowers the cost of equity 80bps. European banks are too dependent on wholesale funding because their ratio of illiquid credit/retail deposit was about 130%. When the wholesale money market imploded with the withdrawal of money market funds and mutual funds, the banks in Southern Europe were on the verge of collapsing and threatened their

counterparts in the Euro area. The €1trn LTRO engineered by ECB weathered a vicious credit crunch in substituting to the paralyzed money market, but it could not solve the balance sheet problem. Furthermore bad management has worsened the problem. Under the pressure of their shareholders, a number of large banks have kept dividend payments at pre-crisis level, thus impairing their capital base. It is due to the corporate governance model called shareholder value, which induces myopic behavior. It straightforwardly runs counter to banks' long-term robustness that implies converting retained earnings in equity and earmarking bonds to bail-in according to Basel III requirements.

European banks must shrink their balance sheets \$2.6trns (about 7% of bank assets) in the aggregate, according to IMF estimate, for both cyclical and structural reasons, the latter accompanying a change in their business model. As long as banking union has not been safely established, the best way to deleverage is in retrenching behind national borders. What has to be sacrificed first is in international banking intermediation. The 2.6trns might be broken down in 2.0trns in asset sale and interbank lending, 0.2trn in euro area credit and 0.4trn in credit to the rest of the world.

The decline in foreign assets of European banks is quite visible in their reporting to BIS. The process has already lasted almost 6 years since Q1 2008 (figure 5). How will EMEs be impacted? Their resilience depends on the magnitude and speed of bank deleveraging in Europe that will trigger capital outflows.. Another round is likely to arise after mid-2014 when the extent of bank losses and capital shortage will be revealed after ECB's asset review of 130 banks.

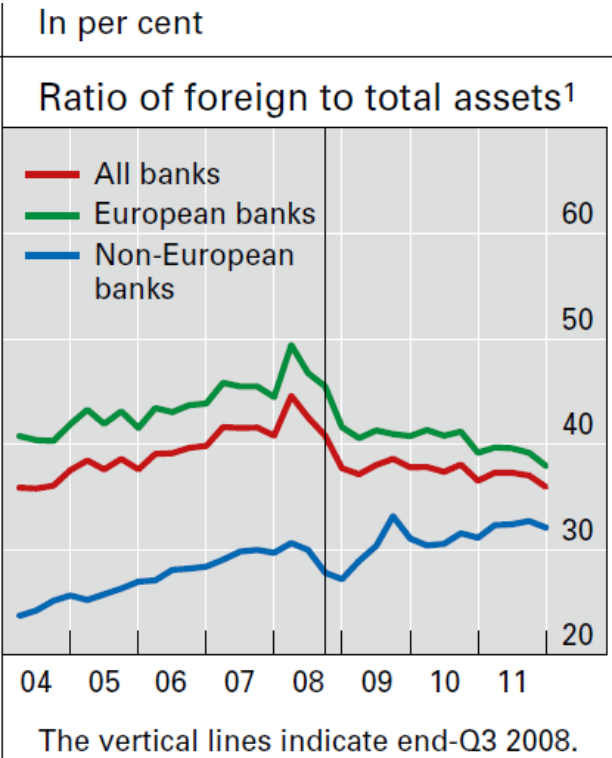
Emerging Europe and to a lesser extent Africa are the most vulnerable regions. Emerging Europe has the tightest banking links to Euro Area banks and the largest external financing needs. They also have the smallest foreign exchange reserve buffers and the least policy space because domestic banks are mainly owned by West European banks. In Asia regional banks and non-bank financial intermediaries, e.g. state development banks and SWFs are more able to substitute to international bank lending. More generally the countries that are vulnerable to capital outflows from international bank retrenchment are those in current account deficits which depend on continuous capital inflows. They are vulnerable to funding gaps arising from spikes in foreign investor risk aversion, as was observed in the summer of 2013.

The segments of finance most subject to funding gaps are specialty finance lines where investment banking has a comparative advantage. These are project finance and longer-term structured credit where syndication and risk sharing must be organized. The problem is that those credit segments most at risk of being curtailed are the ones which finance innovative investments most important to potential growth. The borrowers that are substantially hurt are municipalities and SMEs. It is why new instruments of finance suitable to non-bank investors must be created.

Banks shall adapt to an environment where credit risk will entail higher Tier1 capital and contingent provisions, hence permanently higher demand for assets that can be pledged as collateral. New resolution frameworks aiming at protecting tax-payer money will lead to larger losses of bond holders in the event of resolutions. SWFs will be among those bond holders. Therefore funding costs will be permanently higher for banks, but less destructive financial crises might well lower the social cost of finance in reducing the probability of occurrence of systemic risk. This is not a contradiction, because situations where systemic risk is latent are the ones where the private cost of failure for credit suppliers is inferior to the social cost of financial crises adjusted for the probability of systemic risk (Admati and Hellwig, 2013). Changing the allocation of payment for losses with a pre-defined resolution

framework makes private and social costs closer. In forcing banks and their creditors to be more responsible, the new comprehensive prudential policy, in making micro rules and macro instruments available to central banks and resolution authorities consistent, will improve an intrinsically a imperfect and unstable finance.

Figure 5. Share of cross-border lending by home-country banks



The probability of systemic risk will be lowered, not only by new resolution frameworks with bail-ins and living wills, but also by splitting universal banks to eliminate government guarantees on market finance regulation and by regulating shadow banking much more tightly than prior to the financial crisis. The idea is to induce stricter market discipline to force banks to improve their risk profiles.

There will be permanent consequences on international banking. The flow of cross-border credit will be scaled back permanently, as much as balance sheets will be reoriented toward home markets to reduce risk. Let us call this structural change a move to viable and limited financial globalization, as Dany Rodrik (2011) puts it. It will fit with national States as long as there is no move toward worldwide financial regulation based upon universal regulator and world central banks. This workable international financial system does not preclude regional arrangement like the one that might be established in Europe if banking union is completed.

- *Lack of long-term finance: regime shift needed and opportunities for sovereign wealth funds*

Long-term investments should rise substantially with long-deferred infrastructure needs due to the impact of the financial crisis, the ecological transition and the urbanization drive and industrialization in EMEs. The estimates of the international institutions reach \$18.8trns for 9 major regional or national economies in 2020 against \$11.7 trns in 2010 (table 2).it is a conservative estimate since it is related to moderate growth.

Long-term investment demand will go faster than GDP in every region. Bank-intermediated market finance will not be able to accommodate it within the past design considering the necessary prudential restraints. Neither are pension funds and insurance companies, shackled as they are by the legacy of underfunding, by accounting requirements and by solvency ratios for insurance companies. Among SWFs, those mandated on fiscal stabilization are not expected to provide long-term finance. However the bulk of SWFs is investing national wealth for future generations with truly long horizons. They can manage fairly diversified portfolios across instruments and territories if their ALM is well-defined, meaning that their time-flexible strategies are based upon risk factors and not preconceived asset classes.

Table 2. Long-term investment needs by regions (in constant 2010 prices and exchange rates)

\$trns real	2010	2020	Average growth rate (%)	Projected GDP growth rate (%)
US	3.5	5.2	3.9	2.6
W. Europe	2.2	2.7	2.1	1.6
Japan	1.6	1.9	1.9	1.1
China	3.0	6.5	7.9	7.6
Other large emerging	1.4	2.6	6.3	6.0
9 countries or regions	11.7	18.8	4.9	-

Source:

Since governments are unlikely to fill directly the gap between investment needs and supply of long-term finance, scarce public resources must be used to introduce a new regime of finance capable of attracting more non-bank investors into the realm of long-term finance. It will require designing new methods and instruments to share risk so that expected returns can reasonably be assumed to be higher than costs in risk factor analysis.

The Group of Thirty (*long-term finance and economic growth*, 2013), elaborating on World Bank and OECD suggestions, has made substantial proposals that could lead to a regime shift in finance. The proposals are articulated according to 4 objectives.

First, *ensure that financial investors are better able to consider long-term horizons in their investment strategies*. To do so it is necessary to avoid widespread maturity mismatches in promoting guidelines for the governance of public pension funds and SWFs: discourage passive management based upon benchmarks; use measures of returns consistent with long-term horizons and incentive pays based on long-term returns; avoid maturity mismatches in replacing mark-to-market accounting by mark-to-funding that links the value of liabilities to the value of assets committed to be held onto the maturity of the liabilities. For insurance companies the new minimum capital requirement should be made counter cyclical.

Second, *create or reinforce public intermediaries and design instruments geared toward the provision of long-term finance for innovation*. This is the realm of public private cooperation in project finance, which embodies different types of risks in the different phases of the project. Private sector expertise in providing advice and bringing seed money to start-ups (business angels) should be matched with bridge finance of venture capital funds in the development phase, the latter being set up as alternative assets by long-term investors with risk-guarantee schemes provided by public intermediaries. Other devices to share risk are: credit-risk guarantees, first-loss provisions, subsidies, etc...The public financial intermediaries participating to bridge finance and supplying guarantees are development banks and infrastructure banks. Long-term investors like SWFs can concentrate on the commercial exploitation phase of infrastructure projects, while the income flows for the use of the infrastructure matches the payment flows they must make to the national budget. It is possible to enhance the pool of saving available to long-term investment with compulsory retirement saving programs channeled to SWFs with long-term investment mandates, alike the Norwegian fund.

Third, *develop a broad spectrum of debt and equity financing instruments over a lengthy timeline*. The main field of improvement is strengthening the robustness of debt securitization of SMEs: better disclosure and standardization (plain vanilla ABS), margin calls, centralized clearing and settling houses with direct links to central banks. Enhance corporate bond markets along with the securitization of long-term debt in establishing standards of rating and appropriate capital regimes for institutional investors. What financial investors, candidates to long-term investments, need are well-behaved domestic yield curves for private debts in as many countries as possible.

Fourth, *structure capital controls so that cross-border capital flows support the allocation of international portfolios while discouraging hot money*. China gives the right example. Capital accounts are gradually liberalized as much as domestic capital markets are developed and macro prudential tools are made operational.

Sovereign wealth funds in the transition to sustainable growth: the case of China.

In future decades SWFs will accompany the new era of shifting wealth mentioned in the beginning of the previous section. They will progressively decouple from low-yield, low-growth mature economies into investing in the promising non-OECD world. In doing so, they will partly substitute the banks in recycling saving from Asian surplus countries to deficit high-growth countries in Africa. The maximization of their performance will obviously be intertwined with strategic considerations. Securing future access to natural resources and commodities involves more than future contracts. Mergers and acquisitions in resource-rich countries with the backing of the national governments of the capital-exporting countries are

required. SWFs and public development banks are the financial arms in the process. Therefore SWFs will hold more domestic assets. However, indirectly the flow of income will be foreign via the internationalization of domestic companies. This might be the most effective financial strategy because SWFs will be confronted with rudimentary financial markets, too shallow to deliver minimal liquidity services. In that case, most frequent in Africa, the compatibility between the financial duty of the funds and the broader strategic objectives of the government is achieved in the integrated policy framework analyzed theoretically in the second section.

Besides the safety of resource supply is not the only strategic objective of the rising economic power of China and India. Promoting indigenous and frugal innovation will be a key factor of sustainable growth. With this perspective in mind, financing innovative SMEs will become paramount.

- *Creating entrepreneurship and promoting indigenous frugal innovation*

The usual view of development is a catching-up process through technology transfers. There is a technology frontier determined by the state of knowledge produced by investment in new technologies undertaken in the most developed countries. The technology is diffused according to different channels: buying property rights, welcoming technology-linked FDI, stealing and imitating. The farther is a developing country off the frontier, the wider are the opportunities to assimilate the imported technology and the faster is its total factor productivity growth (TFP). Therefore Western multinationals and their vast network of subcontractors are supposed to be the only vectors of the dissemination of knowledge.

However there is a small problem. The trend of technological progress drives the mode of consumption. Then, imitating the “*American way of life*” is a no future. Long before the Chinese households have reached the same rate of possession of cars, air conditioning machines, etc...as their fellow Americans, the ecosystems of the world would have been destroyed. The whole world is under the threat of unsustainability of the credit-induced, natural resource-wasting and runaway pollution-emitting model. Catching-up countries must leapfrog the historical era of unlimited suburban housing cum universal car ownership and accelerated obsolescence of consumer goods. Indigenous technologies must be frugal.

Frugal technologies are not second-hand technologies. They are drawn from the most advanced pool of knowledge to create new lines of products. They give access to modernity to low-income populations and they are friendly to environmental constraints. Therefore they transform the technology frontier. Frugal technologies are innovations, which are adapted to low and middle-income countries and which will be adopted by developed countries under the constraints of sustainability. Therefore they are reverse innovations. They combine low costs and creativity (Radjou and alii, 2012). They save the use of non-renewable resources and they have a low ecological footprint. Firms in emerging market countries are best placed to undertake them, because they are in the vicinity of large pools of demand for low-cost simple goods that allow only very thin unit margins. In China it will be the realm of private businesses.

Technological breakthroughs embodied in radically new products, bought first by Western

elites and eventually trickling down, are far from being the bread and butter of innovations. Far more important economically are incremental innovations improving products and processes for hundreds of millions of people that will enter the middle class in the next two decades. Frugal innovation can stem from reconfiguring existing technology to spare in the use of raw materials and to reduce the impact on the environment. China and India will compete in this incremental cost-cutting and environment-friendly innovation (Boillot and Dembinski, 2013). Their firms can compete successfully against Western multinationals.

Medium-size private companies can work in flexible networks of associated suppliers organized along mutual solidarity lines structured by their *guanxi*. It makes it easier to adjust to volatile demand with low spare capacities and short waiting lines. Consumer research centers in prominent cities can handle cultural complexities and fuzziness in taste to help transforming new products brought by companies to suit local tastes. The most successful innovations are the ones which can create markets for people that had never consumed industrial products before. They rely on specific marketing able to approach poor people's day-to-day habits. To penetrate the countryside, local governments have also an important role to play in investing heavily in on-the-run education. For instance teaching people basic hygiene is a prerequisite without which markets for soaps and detergents have no chance to take root.

Frugal production inclusive of masses of poor people as customers requires new concepts of management and an entrepreneurship that China is not lacking. What is now at stake is turning the poverty of consumers into strength. Because the private sector is so overwhelmingly important in China, frugal innovation will be a paramount driver of sustainable growth in the present decade. Indeed, in 2010 there were roughly 43 million companies in China, 93% of them were private and they employed 92% of the labor force. These companies need efficient services and capital to prosper.

- *Public financing of private equity funds: an original solution to promote entrepreneurship in China*

An interesting event occurred in September 2012. An agreement was concluded between the French Caisse des Dépôts and China Development Bank (CDB), two public financial entities, to create a common Fund (€150mil. in capital) to finance French and Chinese SMEs in equal parts. This Fund is managed as a PE fund in injecting capital into promising SMEs dedicated to frugal innovations.

The reason of this initiative is that French and Chinese SMEs suffer from the same hardship. They are deprived of bank credit for many reasons: their historical record is limited, the cost of monitoring their debt is high and the unit amounts of borrowing is too low, they have few if any assets to pledge as collateral. Those perennial problems have been magnified by the deleveraging constraints that plague the banks.

The problem is acute in China because the pressure to grow creates high financing needs. Their financial deficits have worsened since 2009 with the increase in input costs due to the rise in unit labor costs and the appreciation of the renminbi. To compete they must innovate

and to innovate they need money. Besides, their traditional access to money is self-finance and largely informal means of external finance (tontines and family finance). These informal credits are not able to fulfill the needs of more than 10 million firms. The problem took a contentious course in 2011 after monetary policy was tightened to tame the inflationary pressures that built along the 2009 stimulating plan. Bank credit contracted and unprecedented failures of SMEs spread in the South East, notably in Wenzhou where tens of SMEs went bankrupt. This is a big challenge for the government because SMEs make 80% of employment in China.

Incentives given to ease access of SMEs to bank credit had only limited success. It is why the Chinese government took interest in private equity. The role of Chinese PE is to channel finance into innovative activities at the local level. Furthermore Chinese SMEs are very active in exports. They make 70% of manufacturing exports of the country. Because the government wants to help the internationalization of SMEs, joint ventures between Chinese and foreign public financial institutions in promoting transnational PE are an effective financial means to this end. Moreover it has the advantage of setting up a financial concept alien to Wall Street-dominated venture capital.

The political stake is high. Who is going to control PE in China? Which public financial institutions are going to participate? The national Social Security Fund has entered the sector since 2008, insurance companies since 2010, the CDB in 2012. The governments want to regulate the whole process in order to prioritize the channeling of the funds into the strategic sectors selected by the strategic planning of the National Development and Reform Commission (NDRC). The intricacies between industrial policy, national planning, public vehicles of finance to enhance private involvement shows amply that China develops a financial model at odds with Western market finance principles. The differences are also notorious in the methods of PE management.

- *The model of PE management in Chinese finance*

Chinese public investors participate to the development policy of the country. Practically they control tightly their investments in PE funds. They siege in the investment committee of the PE fund, have veto rights and exert effective control. This is a very different business model from Western PE. Chinese PE funds are much larger. The managing staff is usually over 100 people. The field of action is broad geographically and sectorally. The relationships with target companies are based on personal mutual trust in conformity with the *Guanxi* cultural model. The large staff allows for continuous presence useful to collect insider's information. It operates in complex structures along with diffuse decision making processes opposite to Western management criteria.

The reasons for the abundance and diversity of the staff in PE funds stem from the business environment in China. SME owners are skilled in the art of manipulating accounts and drawing up multiple accounts. It is why PE managers recruit a substantial number of former accountants. Bonuses are not delivered in the same way as in the West. They are not tied to the obsession of the exit. They are more deal-driven than performance-driven in the Wall Street meaning of the word "performance. Chinese PE might be less performing; however it avoids the insane race of levered PE funds that buy out any firm they can strip of their assets to get minimum 20% financial return in destroying the firm. Then they exit and start it again.

As far as governance structures are concerned, Chinese public investors indulging in the PE business favor horizontal governance structures. They prefer multiple independent local teams

to hierarchical centralized governance structure. The PE department of CDB has many independent local teams, each with light structures. The continuous presence of local staff on the field is more effective to discover the target firms and follow on the realization of the investment. This is all the more important in China because the decision-making power for the policies that impinge upon the activities of SMEs are in the hands of local governments.

The teaching of the analysis of the role of PE in China for the management of SWFs is very important to governance. Investment in alternative assets is the way of the future because it is the type of finance that will prod the incipient sustainable growth regime. However this type of investment cannot be properly managed in standard portfolio allocation models. Deep involvement in the structural policies of the countries and an organization making it easier the relationships with local SMEs are all-important.

Conclusion: the future of sovereign wealth funds

SWFs are going to be important financial vehicles in the future of financial globalization. Their future potency will stem from powerful forces, active in the world economy in the 21st century. The deeper and stronger one is shifting wealth. The bi-century economic hegemony of the West is closing. In less than a decade China will be the largest economy of the world. In 2050 Europe will have shrunk in economic and demographic weight to a secondary region. The US will still be a big and influent power, but a *primum inter pares*.

Financial globalization is retreating to workable and limited intensity in cross-border capital flows because world politics is not yet able to set up the international governance to regulate it. Indeed, the main lesson of the global financial crisis is that finance is not self-regulating. It is not only a question of political economy. It is a fundamental question of economic theory. Finance is not self-regulating because the efficient market hypothesis is invalidated by the logic of market finance under uncertainty, which is driven by momentum leading to long and ample financial cycles, punctuated by devastating systemic financial crises.

Both phenomena, shifting wealth to emerging powers and intrinsically unstable finance, interact to shape limited globalization and the comeback of financial regulation. However it does not preclude the world from remaining open and likely to be organized in vast regional groups of countries with loose policy coordination. The world will stay open because network and environment externalities need world public goods in order to be handled. The growing importance of externalities in environmental resources, scarcity of primary commodities and climate change will reestablish the prominence of the State and more generally of new forms of public private relationships for investing in public goods: infrastructures, renewable energy, smart grids and new principles of urbanization and of circular economies. Those transformations will amount to dramatic changes in life styles and interpersonal relationships.

Finance will adapt to those structural changes and to the aftermath of the financial crisis that was the forerunning event of the coming future. It is where public financial institutions, encompassing SWFs, development banks and other types of public financial entities, enter the picture. They will rise to prominence because banks will retreat from their excessive hegemony on financial markets that had spurred disaster. Meanwhile, both the huge investments to produce public goods and the financing of innovations need long-term finance. This type of finance was scarce under the Wall Street casino model of market finance prodded by international investment banks and universal banks. SWFs and other public financial

institutions, which collect large pools of private saving and make transfers of public saving for the welfare of future generations, are the proper institutions to finance real investments that enhance potential growth.

To close the gap between huge investment needs and the dearth of long-term finance, the model of finance that has failed must be overhauled: less debt and more equity, public private partnerships in setting up PE funds to finance innovative SMEs, new methods for safe securitization, public guarantees in project finance. These are elements in a new financial landscape where SWFs can thrive and make their best for the public good.

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