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Infrastructure Policy for Shared Growth Post-2008: More and Better, or Simply More Complex ?

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1. Introduction

The policy reactions to the 2008 financial crisis around the world indicate that policymakers and their advisors had internalized in a similar way much of the macroeconomic research showing how and when infrastructure can help short to long term growth. According to the IMF staff, the expenditure measures adopted by G20 countries right after the crisis included an average annual additional allocation of fiscal resources of 0.40% of GDP to infrastructure.[2] Infrastructure represented roughly 20-30% of the average fiscal stimulus package size.

Infrastructure thus dominated the recovery packages of many countries to be disbursed, generally over a 2 to 3 year period (between 2009 and 2011). For many developed economies, this additional allocation of resources represented at least a 20% increase over average annual infrastructure expenditures. This effort was larger for richer countries than for the others since, for instance, for middle income developing countries, the increase over recent trends was less than 10% on average.[3] Even if the variance of these additional commitments was large, short term averages were high enough to show the renewal of the policymakers' faith in infrastructure brought by the 2008 crisis.

To a large extent, it simply meant that Keynesian policies were formally back, at least for a while, and that projects anchored in public works were as popular as in Keynes' most famous book.[4] An immediate outcome of the formal return of Keynesian policies was that infrastructure builders, investors and operators could count on strong new fiscal commitments, at least in the few years following the crisis. This is why the project finance business only saw such a relatively modest

[1] This paper was prepared as a chapter for a forthcoming book co-edited by O. Canuto and D. Leipziger (2011), Re-Growing Growth. I am grateful to Danny Leipziger, Leandro Arias, Daniel Benitez, Emmanuelle Auriol, Jose Carbajo, Gael Raballand, Richard Schlirf and Tina Soreide for useful discussions. Any mistake or misinterpretation of facts is obviously my responsibility only.
[2] Freedman et alt. (2009)
[3] There some outliers. China for instance is expecting to add 10-13% of its expenditures to scale up its infrastructure.
[4] Keynes (1936)

drop in 2009.[5] Most countries had decided to use the infrastructure components of their fiscal packages to improve their transport capacity and increase the mobility of both people and goods. Some, such as Brazil, Japan, Portugal or Spain, used the opportunity to address the climate change concerns as part of their efforts to scale up investments in energy.[6] Many also focused on the need to close their ICT gap.

For the longer run, the crisis catalyzed some structural changes in the basic economics of the sector with some significant fiscal implications. The most apparent change indeed is in the future financing of the sector. The crisis, the private reaction to the crisis and the scope for tougher regulation of securitized and highly leveraged investments have provoked a strong and lasting reduction in the appetite of private sources of financing for risky infrastructure projects. In 2009, infrastructure bond spreads reached their highest levels since 2001, with an average of 300bps. This means that the relative importance of private financing will not only drop because the public sector is spending more—an infrastructure specific crowding out issue. It may also drop because the private sector is less likely to be willing to commit equity or borrow to build and operate infrastructures at historical return levels, given its sense that risks have become too high for ongoing returns. Overall, a clear policy challenge is thus that there is a risk that total expenditure levels in the sector could increase by less than the increase in public spending in the sector. This risk may be mitigated by an explicit effort to use public sector resources to leverage as much private financing as possible or guarantees. But since decisions tend to be slow to be implemented in this sector, time only will tell how much of a problem this ended being for the sector.

A risk of crowing out is not the only policy challenge to result from post crisis adjustments. Many incentive problems that existed prior to the crisis and that have not been addressed in the sector are likely to be amplified by the crisis. Many of these incentives issues arise from the large residual niches of technological and policy driven limits to competition in infrastructure. Unfortunately, very few of these policy concerns have made it to the speeches announcing the large commitments to infrastructure investment. Yet their resolution is likely to drive not only the distribution of the gains from the revival of public infrastructure investment but also its long term impact and sustainability. The discussions of the most desirable and politically sustainable solutions are likely to include the revival of passionate debates on the relative importance that the private and the public sector need to have in the sector.

[5] According to Infrastructure Economics (2010), it only dropped by 9% in 2009. This is low when compared to the 42% one year drop that followed the 2001 crisis.

[6] The crisis did not have quick positive impacts on the sector. As business activities and income household income dropped in OECD countries, so did their consumption of electricity and transport services, reducing the financing of longer term service expansions based on user fees.

The main purpose of this paper is to discuss these old and new policy challenges in some detail. It addresses the main issues associated with a scaling up of infrastructure in developed, transition and developing economies. The emphasis is on the likely longer term structural effects on demand, on supply and on the financing of infrastructure transactions of the changes due to the 2008 financial crisis. The discussion explicitly accounts for the fact that infrastructure policy changes will not happen in a vacuum. Indeed, new policies will also have to deal with the need to adapt for the long term to the many new constraints on technology and on demand associated with the concerns with climate change and with the growing desire to develop regional infrastructures to provide better growth opportunities for the smaller economies, specially the landlocked ones. These emerging issues have strong regulatory implications discussed here as well since regulation drives the drive of risks which in turns drive the fiscal costs and risks of the sector.

The paper is organized as follows. Sections 2 and 3 review the longer term effects of the crisis on demand and supply respectively. Section 4 discussed the fiscal implications of the adjustments of the financing options in infrastructure to the crisis. Section 5 exposes the main policy implications of these changes. Section 6 discusses additional concerns for the design of infrastructure policies due to the new global context. Section 7 concludes.

2. Has demand for infrastructure changed post-crisis?

Less than 10 years ago, the academic discussions on the demand for infrastructure were largely focusing on the estimates of the elasticity of growth or of productivity to infrastructure stock. No-one really seemed to use that research to have a good sense of how much infrastructure was really needed to support various growth scenario.[7] For developing countries, this changed during the first decade of the 2000s. In the last 5 years, every major international development agency has provided estimates of the infrastructure needs which vary across regions, according to the average development level of that region.[8] This section summarizes the most quoted estimates of investment and associated operation and maintenance costs in the sector. It then discusses how the crisis is likely to have impacted these figures.

[7] For a recent survey, see Estache and Fay (2010)

[8] See for instance, the World Bank (2005) and Fay and Yepes (2003) who provided the initial estimates on behalf or the World Bank. Similar estimates have been produced by the NEPAD (2002) and Kandiera (2009) more recently for the African Development Bank; Fay and Morisson (2007) for the World Bank and the Inter-American Development Bank, the Asian Development Bank (2009) recently updated its estimates.

2.1 How much infrastructure is needed?

While precise figures are clearly country specific, the order of magnitude of the global estimates gives a credible quantitative sense of the importance of the demand for infrastructure around the developing world. A rough averaging of the various estimates usually quoted suggests that many of the poorest developing countries need to invest over 6-7% of their GDP in infrastructure, varying from about 5% on average in Latin America up to 3 times as much in Africa and South Asia.[9] Depending on the size of the existing capital stock, between 50% and 150% of these amounts need to be spend in addition to operate and maintain the stocks. The orders of magnitude provided by research are summarized in table 1.

Table 1: Ranges of annual infrastructure investment needs estimates as share of GDP for 2010-2015	
World	3 – 5%
Developing countries	6 – 8%
Of which	
Sub-Saharan Africa and South Asia	9 - 14%
East Asia, Eastern Europe and Middle East	6 - 8%
Latin America	4 - 6%
Source: Author's compilation from ADB (2005, 2009), Fay and Morisson (2007), Foster and Briceno (2009) OECD(2006, 2007), Yepes (2007)	

Developed countries have followed the lead of developing countries and have also tried to assess their needs. The OECD has provided the most encompassing assessment of the global investment needs in water, telecommunications, road, rail and electricity of a world growing at an average of 3%/year.[10] It estimates annual global investment requirements, including developed and developing countries, around an average of 3-5% of world GDP. Clearly the needs of the most developed countries are relatively lower than those of developing countries since their capital stocks are already quite high. Yet, they should not be underestimated they compete with developing countries compete in the international markets for funding, usually attractive risk-return alternatives.

[9] Yepes (2007); note that the data for the investment needs appear to be sensitive to the method. For Africa, for instance, the bottom-up approach followed for water and energy by the Africa Infrastructure Country Diagnostic (AICD), summarized by Foster and Briceno (2009), suggests that the top-down approaches based on macroeconometric estimates such as the Yepes (2007) tend to underestimate the needs. But these differences in methods are sometimes credited with differences in estimates which are not totally correct. The AICD coverage of infrastructure included ports, irrigation and electricity transition and distribution which were omitted in the estimates quoted by the Africa Commission estimates of Africa's infrastructure. The differences in coverage explained a lot more in the difference of needs than the differences in methods.

[10] OECD (2006, 2007, 2008)

2.2 How much should the crisis impact the needs estimates?

Did the crisis impact these estimations? Did it imply an upward or downward shift in the slope of the infrastructure demand function? Not really. To be able to see that the core demand for infrastructure has not been impacted by the crisis, it is important not to be misled by two short term facts: (i) effective demand for electricity and transport for instance dropped in 2008 and 2009; (ii) short term effective supply increased in some infrastructure subsectors.

First, the drop in short term demand says nothing about the trend. As suggested earlier, it would be a mistake to re-estimate the trend of the needs based on data from 2008-2009. The crisis has hurt current demand for infrastructure even if it has not had any impact on the long term demand driven by the growth prospects of the world. In most countries, the demand is simply temporarily slow, it will recover as employment and income increases. The sense that infrastructure supply around the world is rationed continues to be validated by academics studies of the demand for infrastructure.[11] It is also validated by consultations of private sector actors. A survey of business executives conducted by KPMG in June-July 2009 in 69 countries shows that 79% are at least somewhat concerned that the current levels of infrastructure spending are not sufficient to sustain the long term growth of their economies. [12]

Second, it would also be a mistake to assume that the short term increases in investment and some sectors reflect a response to an anticipated upward shift in long term demand. In most countries, it is simply an acceleration of a planned supply, not a shift. France may have been the most explicit on this aspect. When it unveiled the details of a fiscal package worth €25.9 billion (around 1.5% of its GDP), about 40% corresponded to measures aiming at bringing forward planned investment.

One major change in demand may take place however, as discussed in more details later. Changes in demand will result from the new global concerns for climate change. The need to create jobs and to scale up and speed up the coverage of infrastructure has given an exceptional opportunity to meet the global demand for a greening of infrastructure and its use. While demand management for energy, transport and water aimed at reducing the environmental effects is likely to somewhat reduce the demand per capita, it is also likely that total demand over time will continue to grow as income levels, and the middle classes, grow with development.

[11] See Straub (2008) for a global view on the evidence on the linkages between infrastructure and development.
[12] KPMG (2009a)

2.3 Summing up.

Overall, the basic drivers of the demand for infrastructure have not been significantly changed by the crisis. The long term elasticity of demand will continue to depend on the stage of development and the growth forecast while the short term elasticity will be driven by the short term economic conditions. The long term needs have been relatively well known for a while. The world is quite familiar with the coverage gaps for water and energy in the poorest countries of the planet. The strongest impact may simply have been the increased visibility of the sector around the world and the increased realization of the cost of the significant additional investments that need to be made to meet long term demand.

3. How will the supply of infrastructure post-crisis change?

The stimulus packages designed to reverse the negative employment and growth effects of the crisis are obviously expected to have both short term and longer term impacts. This section discusses in some details the short, medium and long terms impact of the crisis on the supply side of the infrastructure market. It then looks at the extent to which public procurement process influence these effects as well as their sustainability.

3.1 The short term impacts on supply

The main and most obvious effects of the stimulus packages are on infrastructure jobs. Low skills jobs can relatively easily be created during the construction phase of many infrastructure projects to allow some of the populations most exposed to the crisis to get an income and to spend. A survey conducted by the Canadian government in 2009 documented significant infrastructure components in over 30 OECD and upper middle income countries, illustrating the importance of infrastructure on the agenda in those countries.[13] A similar survey conducted for 54 countries by the International Labor Organization (ILO) covered many low income countries and found that 87% of the countries had some infrastructure component. According to Khatiwada (2009), the proportion of stimulus on infrastructure spending was on average three times higher in developing and emerging economies than in developed economies. The ILO survey also showed not only that infrastructure was also a major element of the recovery for many of the poorest countries but that it was particularly important to create jobs.[14]

[13] Foreign Affairs and International Trade Canada (2009)
[14] ILO (2009)

3.2 The medium term impacts on supply

The medium term effects on infrastructure supply of the stimulus packages are not just about labor intensive infrastructure. As mentioned earlier, they are also about the timing of supply and in particular to opportunity to speed up delayed investment decisions in the sector. Indeed, as more resources become available to the sector thanks to the stimulus packages, governments are likely to manage to expand supply to levels closer to those needed to meet long term demand. For some regions, this can produce a major supply effect. Consider for instance the case of Sub-Saharan Africa. For the last decade or so, Sub-Saharan Africa has invested about 50% of what it needed to invest to sustain the high growth rates necessary to pull the 50% or so of Africans who live in poverty out of their unacceptable fate.[15] It is difficult to believe that the significant volumes of aid resources mobilized by donors will not help close this gap lastingly. But the need to speed up investment is not just in developing countries. The overwhelming domination of the transport sector as a beneficiary of stimulus packages in OECD countries reveals the concern for the logistic support to growth in these countries and the need to take decisions that had been postponed in the sector for too long. The Australian plan for instance, brought forward US$660 million in road funding.

3.3 The longer term impacts on supply

A more subtle but just as important and clearly more lasting effect of the crisis is the transformation of infrastructure supply to address climate change concerns that require both adaptation and mitigation interventions. Investments types and technologies are being adjusted to meet the demand for the greening of the sector and to meet the growing concern with anticipated natural disasters or with their consequences. China has allocated US$25 billion to be spent on infrastructure in the Wenchuan Earthquake affected area. South Korea has allocated US2.3 billion over 4 years to develop green technologies, such as solar and wind generation, fuel cells and carbon capture and storage. The US has allocated of US$19 billion to deal specifically with flood control and sewage and water treatment.[16]

3.4 How public procurement processes influence the expected supply impacts

The most complex aspect of the analysis of the supply effects of the crisis may be the evaluation of the speed at which the decisions can lead to short term

[15] Foster and Briceno (2010)

[16] These are just three examples among the many that can be identified in the details of the stimulus around the world. Foreign Affairs and International Trade Canada (2009) and ILO (2009) are two useful sources for more details.

results on the ground. Indeed, the implementation of the decisions to expand or modernize the strategic infrastructures is likely to take longer than casual observers may anticipate. Lots of decisions have been taken to spend more and faster, very few governments, if any, have considered the need to deal with the processes which allow infrastructure supply to grow.

How do processes put the supply effects at risk? The first reason why the short term effects may be slow to show to meet political and popular expectations, relates to common procurement processes. These processes need to be factored in when assessing the impact of a fiscal stimulus largely anchored in infrastructure investments. Even under accelerated procedures, procuring public works generally takes over a year, often twice as much, to implement from the time the decision to go ahead has been taken. Specifying the terms of reference, organizing the auctions, assessing the bids, preparing the contracts, and negotiating these contracts are all essential steps typically needed before the works can start. In the German debates on the composition of the public expenditures to be financed by their stimulus package, the infrastructure sector was in fact penalized in the short run because of these procurement issues. The German stimulus plan favored investment in education to some extent because the German technocrats were quite aware of the slow procurement speed of large infrastructure projects and the risk it represented for the effectiveness of the recovery efforts. The German concerns with the slow processes of the public sector infrastructure activities have recently been validated by a survey covering many more countries. [17] In that survey, 23% of the 455 senior public officials consulted in 69 countries around the world felt that governments were not able to meet commitments at the development or contract stage and 30% at the implementation stage.

3.5 How sustainable are the supply effects?

Slow or unreliable procurement practices are not the only reason why increased in infrastructure supply there are some disagreements in the policy and academic communities on the extent to which infrastructure is the most effective short term instrument to deliver sustained longer term growth. Additional arguments have been used by politicians to justify some reluctance to bet on an increase in infrastructure supply as a fiscal stimulus. These arguments have been fueled by differences in expectations associated with key dimensions of infrastructure expenditures.

There is some disagreement on the intensity and the sustainability of job creation through infrastructure. [18] The real issue is the extent to which

[17] KPMG (2010), p13
[18] ILO (2009)

infrastructure projects do more than create short term jobs. There seems to be an implicit assumption in the political speeches that the effects on jobs will be sustained and go beyond the short term jobs in the sector due to the construction phase. In practice, the extent to which the jobs will last and multiply largely depends on the speed and the duration of the growth impact of the infrastructure stimulus. Since infrastructures take quite a long time to build, short term multipliers should be expected to be lower than longer term ones.[19] Most researchers do not distinguish between short and term effects and find an infrastructure multiplier in the range of 0.5 to 1.[20] These conservative estimates give some reason not to be overoptimistic on the job effects of the policy. Stevans and Sessions (2009) suggest that this order of magnitude is fine in the short run but underestimates the longer run effect. According to them, in the US, it reaches 0.867 after a year but gets to 3.3 after 2 years when all secondary effects are properly accounted for. This happens because the real growth payoff comes after the construction phase, once the new assets can actually be used to meet demand.[21]

There also some concern with the extent to which the job creation will be local rather than abroad. Expansions of spending in the sector often implies some external leakage from the basic short and long term multiplier effects which are not picked up by macro models that do not account for some key sectoral dimensions. Indeed, for some infrastructures, many basic components are imported meaning that some of the job creation impact is abroad. For instance, for many countries, the rolling stocks components of railways expansions are imported. This concern for subsidies to external jobs has been a reason why the domestic multipliers have not always been as high as hoped for.

3.6 Summing up

In sum, the overall impact of the crisis on infrastructure supply must be unbundled into its short, medium and long term components as well as into the various expectations increases in infrastructure investments must meet. When these various dimensions are considered, it seems reasonable to argue that the long term effect is likely to be modest. The supply will have to meet the demand sooner or later for the growth effects to reach their potential. The short term composition however may be influenced by a number of factors and the associated

[19] Spilimbergo et al (2009)

[20] See for instance Shanks and Barnes (2008)

[21] The fact that the supply effects of increased government investment in the sector is uncertain because of the time it takes to build that investment is not new. The original idea can be credited to Hayek (1940) and its most elegant analytical presentation can probably be attributed to Kydland and Prescott (1982). All these illustrious authors already warned that the structure and time of production of a good is a possible source of persistence of business cycle underestimated by models ignoring the important of these timing related dimensions.

risk of failing to meet expectations may lead politicians to favor other expenditure types over acceleration of infrastructure investments.

Globally however, the undisputable beneficiaries of the crisis are infrastructure suppliers. Their sector has benefited from a major improvement in the general awareness of its importance and has guaranteed short financing to the sector. The crisis has also provided an opportunity to address the increased concerns for more environmentally friendly infrastructure supply around the globe in the choice of supply technology. Ideally, the relatively large amounts committed by government should allow large scale investments in climate friendly technologies, serving as a tipping point not only allowing but also forcing infrastructure to switch from inertia in its investment decisions towards pro-active decisions to deal with climate change.

4. How much will the fiscal cost of infrastructure change post-crisis?

Understanding the fiscal consequences of the crisis requires an assessment of the long term impact of the crisis on the various financing options of the infrastructure sector. It turns out that this is where the complexity of the impacts of the crisis on the sector stands out. A fair assessment of these impacts requires a distinction between: (i) the sources of cost recovery for investments and operations of the activity and (ii) the financing of the investments needed to deliver the service. This discussion can be quite sensitive as it requires touching upon the highly controversial debate on the scope for a private sector role in the delivery of infrastructure services. The way out of the controversy adopted here is to focus on the evidence on the size of private contribution observed in relation to the size of the needs. The discussion of these issues is organized as follows. It starts with a review of the evidence on the scope for cost recovery to minimize the fiscal burden of subsidies in the sector. It then takes stock of the evidence on the scope for opportunities to cut the financing requirements thanks to a larger role for the private sector. It concludes with a discussion of the importance of risks in the distribution of financing costs between the public and the private sector.

4.1 How could costs be recovered to minimize the fiscal burden?

With respect to how costs should be recovered, the initial point, that unfortunately continues to be as relevant after the crisis as it had been for quite some time before the crisis, is that costs need to be cut to minimize the financing requirements. In Africa for instance according to the recent diagnostic summarized by Foster and Briceno (2010), a more efficient use of infrastructure resources could cut these requirements by close to 20% of the total needs estimated. Close to 50% of that saving could be obtained by addressing operating inefficiencies through better road maintenance and greater efficiency at power utilities alone. A

formal review of the regulatory decisions at the time of tariff revisions under price cap regimes suggests a similar scope for efficiency gains to be achieved across sectors in other regions, including the most developed ones.[22] Making the most of the scope for cost savings is also a way of allowing the fiscal packages to get a bigger bang for the buck. Lower unit costs means that for a given stimulus budget allocates to infrastructure, more infrastructure can be built or maintained, or more people can be subsidized if needed.

Ignoring for now the need to cut costs, and before trying to figure out who needs to pay what how much, it is useful to remember that any cost recovery can only be targeted to three main groups of actors: the users (who often pay for at least part of the cost that needs to be incurred to deliver the service they consume), the current taxpayers (who finance subsidies through their tax payments), and future taxpayers (when current subsidies are financed through bonds or other forms of loans).[23]

Until the 1990s, current and future taxpayers had supported the bulk of the cost of operating and expanding the service since subsidies tended to be quite common in both developed and developing countries. Between the 1990s and the mid-2000, the dominating philosophy changed. Most policymakers started to argue that users should be taking on most of the financing of what they were using or consuming. Tax and loan financing were viewed as being unfair and poor instruments to manage demand. After some social unrest associated with this new philosophy (the Bolivian rejections of private water operators for instance enjoyed strong media coverage around the world), policymakers adopted that strategies that started to rely again on taxpayers. By the mid-2000s, many policymakers became convinced again that relying on full cost recovery from users were politically unviable for basic infrastructures such as water and urban transport. This explains why subsidies and cross-subsidies progressively crawled back as the concern for affordability started to dominate the policy debates. Under the current political, social and economic environment, there is no reason to believe that this new trend will be reversed again any time soon. In other words, taxpayers are likely to become again the main source of cost recovery in this sector.

In the few years following the launch of the stimulus packages, initial evidence is already starting to validate that prediction. The fiscal packages will finance investments which will not all be recovered through utilities tariffs and transport user charges. The amounts of subsidies without the fiscal packages were in fact already quite significant. For the energy sector, Bacon et al. (2010) estimate subsidies given annually to energy around the world at about 1% of the World GDP.

[22] Recent good sources of such reviews include See for instance Walter et al (2009) for water and Haney et al (2009) for electricity.

[23] Actually for developing countries, foreign tax payers could be a source of funding since international aid is an additional source of funding of loans and grants.

This corresponds to about a third of the most conservative estimates of the annual electricity investment needs in developing countries. While governments are increasingly concerned with the distortions associated with these subsidies and their long term fiscal costs, the increased fiscal space allowed by the stimulus packages will have increased the scope for such subsidies. [24] Subsidies in railways, ports and airports will continue to be justified in terms of the positive regional or national employment effects. In energy, urban and transport and energy, they will continue to be justified by the concern to ensure affordable public services. But subsidies are significant nonetheless.

4.2 How much will the private sector reduce the fiscal financing requirements?

From a project finance perspective, the evidence points to a clear drop in the average global level of new private commitments to infrastructure projects.[25] There is however a strong variance around the world. DLA Piper (2009) reports a significant drop in Europe as a result of the crisis and no obvious recovery in sight for 2010. According to the World Bank PPI database (consulted in May 2010), the average impact in developing countries has also been quite strong with a drop of 45% in commitments in 2008, although with a recovery of 15% in the last quarter of 2009. Yet the distribution around that average drop is huge. In fact, the 2009 recovery is largely driven by Brazil, China, India and Turkey who have continued to benefit from large commitments, in particular in the energy sector. Without these 4 countries, the 2009 average figure for developing countries in facts reveals a 58% drop in commitments.

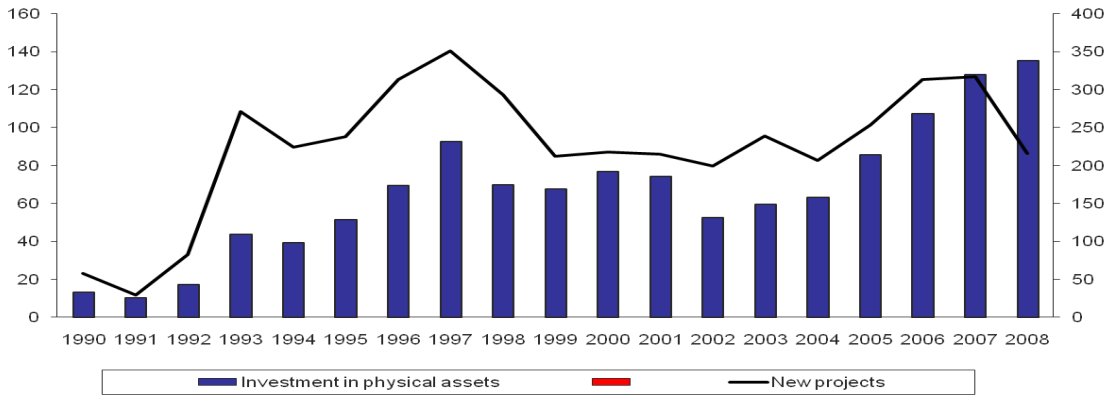
The 2009 continued drop may reflect a lag between decisions to slow investments and signed commitments. Large infrastructure Contracts take 18-24 months on average to get signed, so that the full real impact is only likely to be observer from 2011 on. Many of the contracts signed in 2008 and 2009 were simply the end product of activities started earlier, suggesting that the current figures may still underestimate the full impact of the crisis. It took 3-4 years after the 1997 East Asian and the 2001 Argentinean crisis to get a sense of the full impact on the PPP market in developing economies as seen in Figure 1. Given that the 2008 crisis was more similar to the 1997 East Crisis in scope and degree of surprise, it would be reasonable to assume that it is likely to generate an equivalent response of the market. The main difference is the strong Keynesian response to the current crisis which should offset and reassure to a stronger extent.

[24] Khatiwada, (2009) and ILO (2009)

[25] History will obviously tell us, but for existing regulated infrastructure, there has been no evidence of major increases in the costs of capital. In the UK or Australia where tariff revisions were underway when the crisis hit, the crisis was seen as a temporary shift in risks which should not impact the cost of capital for the full revision period and hence should not influence the average allowed revenue and tariffs.

The drop in the number of projects observed so far is quite consistent with the evidence available on the returns to equity and bonds in the two years that followed the crisis and the associated increases in the cost of capital expected for the sector. Observed returns on infrastructure equities reflect the short term drop in demand and the uncertainty of the long term financing options for the sector. Despite the strong public commitments, during 2009, infrastructure funds had returns 50% lower than the average market return. Indeed, the S&P 500 Utilities Index/S&P Global Infrastructure Index showed a 25.2% return, while the global equity market returned 37.76% (measured by the S&P Global BMI Index) gained 25.3%. The stimulus plan did have an impact however, as within the S&P Global Infrastructure Index, the transportation infrastructure sector led (about 41% increase)up 40.7 percent), driven by the large toll road companies which increased in value as the economic recovery led to improved traffic flow. Utilities trailed with a return of 5.6% for the year. While returns are lower, the cost of bond financing has increased fast to internalize the new risks seen in the sector despite the strong public sector commitments. Indeed, the evolution of the prices on the bond market is quite consistent with the lower commitment levels. Few infrastructure bonds were placed in the market in 2008-2009 and the costs of bonds and fees associated to PPP have almost doubled, imposing a very significant increase in the cost of capital in the sector. [26]

Figure 1: New investment in physical assets and number of projects In developing and transitions economies (1990-2008)



Source: World Bank PPI Database

[26] Infrastructure Economics (2010) offers a useful and well documented analysis of the impact of the crisis on debt financing in the sector.

4.3 How much does the fiscal cost depend on risks perceptions?

A recent paper by Tenorio, V. and C. Idzelis (2009), building on interviews of key players of the infrastructure finance world, reflects the increased anxiety with the discovery, through the crisis, that infrastructure assets are not immune from a downturn and hence that cash flows are less predictable than assumed in many project finance designs. Key actors such as pension funds seem to have discovered the demand side of infrastructure. The roughly 80 large global infrastructure funds seeking an estimated $100 billion of commitments from financial institutions with large liquidities to place for the long run such as pension funds and insurance companies are not finding much success.[27] This may explain why in the US, rather than relying mainly on PPP for large scale infrastructures, tax-exempt bonds to build and repair structures are seen as more reliable financing tools.

It is thus not surprising to see operators more interested in bidding for contracts to be funded publicly than spending much time trying to convince the financial players of the long term prospects of the sector. The evidence is as robust for developing countries as it is for developed countries with the exceptions of some of the major middle income countries.[28] The collapsed bond and syndication markets have indeed taken their toll on financing for private foreign and domestic investments in infrastructure projects that require long term commitments in risky environments. How long that impact will last is also likely to depend on the changes in the regulation of risky assets, including infrastructure assets, the international community will decide and on when investors are expecting these changes to be decided and implemented.

Since the rationing of demand due to insufficient supply can be explained, for a good part, by a financing gap, any reduction in the private financing of the sector will have to be addressed. If risk levels continue to be perceived as too high, the challenge for governments around the world will be to cut the fears of private investors without stimulating the risk of bubbles and without allowing cherry picking that ends up cutting opportunities for cross subsidies within countries and increasing the public share of the costs of financing the sector. For developing countries, a reasonable target is to do so enough to at least maintain the 20% share of private financing has contributed to the needs of the sector in the decade prior to the crisis. It turns out that it may not be a bad target for developed countries as well. Hall (2008) reports that in the UK, where the value of PPP transactions have increased sharply during in the 5-10 years prior to the crisis and which is generally seen as one of the greatest markets for PPPs, these transactions have

[27] Most private infrastructure funds are sponsored by large financial institutions through their investment banking units.

[28] e.g. EPEC (2009)

accounted only for about 10-15% of all public sector capital investment since 1996.[29]

Until that target is met, it is very likely that the drop in the appetite for risky investments demonstrated by financial institutions will further fuel the short to medium run and possible longer run demand for public investment and subsidies. Hall (2008) reports that a survey conducted by Siemens just a year before the crisis exploded, public loan financing was widely expected to remain the key financing instrument across Europe. The upshot is that it is very likely that the public sector will to continue to be the major source of financing for the sector and that this trend will be reinforced in the post crisis world, if new ways of managing risks are not introduced. Both regulation and guarantees (with their own fiscal costs) are likely to be essential instruments in that effort as discussed later.

Overall, thus, the market for infrastructure project finance will survive the crisis and obviously, the private sector will continue to be an important minority source of financing for the continued need to increase or upgrade infrastructure. Yet, it is unlikely that PPPs will any time soon represent the main way of financing infrastructure in particular in developing countries. Private financing has not been larger than 20% on average since PPPs took off in the late 90s and there is no factual evidence suggesting that it will be otherwise in the future once current relevant trends are accounted for.

4.4 How can the fiscal consequences of higher risk aversion be mitigated?

Since increased concern for risk is likely to increase the pressure on government to pre-finance infrastructure needs and since governments are at the same time concerned with the sustainability of increased fiscal gaps, it is crucial to assess how to minimize the fiscal effects of risks. The 2008 financial crisis is thus providing an opportunity but also forcing the international community as well as individual countries to revisit the fundamentals of the PPP approach. There is no real solution yet to this challenge, but the identification of the solution will have to start with a good degree of humility and realism.

This review of the lessons of experience needs to start with the growing evidence on the PPPs' failure to deliver on expectations, in particular for some types of infrastructure activities such as water and sanitation, urban transport systems and to some extent also in the road sector. Engel et al. (2008) for instance suggest that from a fiscal viewpoint, PPPs did not really relieve budgetary restrictions and release public funds. PPPs have often been used to circumvent budgetary oversight and anticipate government spending. Recognizing upfront the real fiscal cost of the

[29] According to EPEC, from 2001 to 2007, the UK signed 501 PPP deals while Spain and Germany who came in second and third in terms of the number of projects had signed 38 and 34 respectively.

instrument would already be a major achievement and help minimize the risks of fiscal surprises.

The review also needs to build in the recognition that pervasive use of government guarantees to increase the volume of PPPs has not helped as much as expected. The evidence reported in Engel et al. (2008) also suggests guarantees may have reduced the potential of PPPs evaluation teams to filter white elephants, at least in developing countries. This is why the fiscal costs associated with guarantees does not necessarily lead to the expected growth effects. It often boils down to a redistribution of risk between the public and the private sector. Guarantees kick in as post-transaction cost increases passed on to taxpayers rather than users. Engel et al. (2008) summarize theoretical and empirical evidence on the fiscal costs of contracts renegotiations in developing countries. Hall (2009) provides indirect evidence and suggests that accounting practices may have helped redistribute the risk in Europe. His detailed synthesis of various European decisions suggests that the limits on government borrowing imposed by EU, national and IMF policies may have allowed costs associated with PPP to be accounted for as non-government expenditures even if they were tax financed. [30]

4.5 Summing up

The overall conclusion of this discussion of the recent evolution of financing strategies of the sector is simple enough. The crisis may have simply revealed the importance of continuing to expect that the government and hence the taxpayer will be a major source of financing of the sector.

The specific forms of intervention will include subsidies and guarantees but these should ideally be recognized in ex-ante budgets to reduce the risks of unexpected fiscal shocks. These budgets should also reflect the fact that public sector participation is also increasingly likely to take the form of equity stake and that governments should get their fair share of return for risks taken to offset some of the expected fiscal costs of the sector. Budgeting properly is needed to ensure that the fiscal contribution is consistent with the fiscal ability of governments.

As suggested by Burger et al. (2009), government's exposure to risk should be consistent with the wide fiscal policy stance, be contingent on clearly specified circumstance and adequately costed and budgeted. This has to be a condition for the sustained use of tax resources in the sector.

Additionally, governments will have to ensure that the financing process is fair and efficient and fiscally sustainable. As a rule of thumb, efficient, fair and

[30] Commission Interpretative Communication On Concessions Under Community Law (2000/C 121/02) http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2000:121:0002:0013:EN:PDF

fiscally sustainable should anyway be the three benchmarks against which public decisions the reforms of the role of the state in sector in the post-crisis era. This is not new for public economics academics but it may be for some policymakers.

5. Strengthening the traditional government roles in infrastructure

Infrastructure is a major share of any economy. On average, it represents very roughly 12-18% of GDP depending on the country. What is remarkable in the context of this paper, is that, most is already managed directly or indirectly by the public sector but that many non-government actors have a stake in the policy decisions in the sector. The large fiscal importance of the sector may be the most interesting one to the media and macroeconomists since it deals with the necessity of softening the real social and growth consequences of the mismanagement of a financial sector largely allowed to define its own regulation. It is also the most interesting one to the construction firms and firms specialized in the operation of infrastructure sector since it defines the demand for their services in the short run as the new infrastructure get built and in the longer run as the larger new stock require maintenance. It is finally of particular interest to the operational staff of the infrastructure departments of development banks and agencies since it provides the necessary financial support to their core business. Unfortunately, the focus of these multiple sources of interest also reflects the continuous disdain for the microeconomic dysfunctions of the sector. The main purpose of this section is to discuss the various policy areas on which reformers should focus, as they try to manage the fiscal dimensions of the sector. It covers efficiency and equity concerns, it covers public sector management of key public sector responsibilities with high fiscal costs such as procurement, risk management ad sector planning.

5.1 The forest behind the fiscal tree.

In a post-crisis world, just like there is a lot of talk about how to improve the regulation of the financial sector, there should be a lot of talk, and eventually a lot of action, on how to improve the regulation of the infrastructure sector. This may be the biggest challenge of the sector and it needs to go well beyond the debate on the fiscal importance of the sector.

There should also be an interest in assessing the drivers of the policy decisions on how to use the public resources. These have to ensure that the investment made in the sector to support the infrastructure needs of growth are not associated with unanticipated increases in fiscal costs. From the perspective of infrastructure policy, stimulating jobs and income will only be sustainable if these microeconomic policy diagnostics are conducted properly. This is not to deny that the emerging tip everyone focuses on during a crisis is essential but it focuses on

the short term temporary role of government, it says nothing about the more subtle concerns that should define the medium to long run policy agenda.

The real infrastructure policy challenges come from what no budget will show. No budget really assesses seriously the extent to which the short term policy decisions deal with the long term needs of the sector. None seriously discusses the risks of financing many small white elephants with the excuse of increasing expenditure in the sector to promote growth and jobs. Even less in time of urgency than in regular time, none really shows any concern for how much rent will construction firms, bankers and operators capture on the back of the taxpayers and the users.

Such structural concerns do not seem to be interesting questions for the opinion makers of the world. Dramatic corruption cases, accidents and abusive prices seem to be the only indicators of poor public sector management which can alert the opinion. The serious incentive problems that lead to these issues have not been on the agenda so far. Yet, they can have huge fiscal costs to be covered by today and tomorrow's taxpayers. The post-crisis deficit concerns may provide a good opportunity to start addressing them.

Where should the discussion start? The obvious answer is to start with an assessment of the opportunity the crisis has been to improve regulation in the sector. From an efficiency point of view, it is essential to get a sense of how effective regulation will have proven to be in improve the incentives for operators to invest in much needed low cost coverage in some parts of the world and in innovation and modernization in others. From an equity point of view, it is important to get a sense of how fairly operators, users and taxpayers will be treated as a result of the expanded role of government in financing the sector.

5.2 Strengthening the efficiency outcomes of infrastructure regulation

For many countries, regulation had been the main weakness of the infrastructure sector prior to the crisis, just as it had been the weak spot of the financial sector. Countries relying on self regulation of infrastructure services had traditionally been exposed to political interference with optimal regulatory decisions. The decision to increase the independence of regulators in many countries boiled down to simply create a separate institution in charge of regulation without being very successful at eliminating political interference in the sectors. This as true in OECD countries as it is in developing economies. Even if there is evidence of a positive impact on outputs, quality or prices of the institutional unbundling of policymaking and regulation in most infrastructure sectors, there is just as much evidence of the limited capacity of these agencies to have the necessary independence to manage crisis when these arises. The almost total

suppression of independence of Argentinean regulators immediately after the 2001 crisis that resulted in a suspension of many of the contractual commitments to the operators is an extreme example. But similar, albeit not so extreme, forms of interferences have also been observed in Europe for instance and it is hard to ignore that it is common practice in the US to have political appointees sitting on the board of state level regulatory agencies. [31]

Unhappiness with the management of regular or extraordinary tariff setting processes around the world has been increasingly well documented by researchers interested in understanding the sources of regulatory failures. Since 2000, this has allowed the literature on the independence of regulation to go beyond the normative debates that discuss the choice on regulatory institutions as a binary one: with or without independence. As nicely summarized by Andres et al. (2008), the literature on the regulatory agencies has focused on identifying quantitative or at least qualitative indicators for three main aspects of their design:

- their management autonomy and independence from political authorities;
- mechanisms to make them accountable (both to other branches of government and to the public); and
- the transparency of both their rule and decision-making procedures.

Very few countries, whether developed or less developed, score very high jointly on the three dimensions.

A review of this evidence in the new context defined by the 2008 crisis leads to an alarming message. It shows that infrastructure regulation, just like financial regulation, has not systematically been conducted in the simultaneous interest of the main stakeholders involved (users, operators and taxpayers). When regulators were created as part of a privatization strategy, the evidence suggests that any weakness of regulation has tended to benefit the private operators. If operators were losing money, they would pull out or close the business. With the exception of the odd experience of Enron, there are no obvious cases of bankruptcy in telecoms, energy or water services around the world. There are a few cases in which large operators have pulled out of a country, as in Mali or Senegal for instance. Regulation is still an outstanding challenge in infrastructure as it is in finance.

5.3 Strengthening the fairness of infrastructure regulation

The incidence of the imperfect regulation is also quite obvious. The winners have no changed from the evidence showed it 5 years ago: investors and operators

[31] See for instance, Gilardi (2002) and Johanssen (2003)

have done quite well.[32] For instance, infrastructure stocks and funds outperformed the respective market averages for the last 10-12 years, roughly since the liberalization of the sector started to be implemented. Peng and Newell (2007) studied the total returns for the listed Australian infrastructure funds and companies from 1995 to 2006. As seen in Table 2, infrastructure funds outperformed all other investments. A similar assessment conducted by RREEF also just before the crisis, a Deutsche Bank research branch, confirmed the Australian conclusions, showing that infrastructure funds in the US and Europe outperformed many other assets, although not all of them.[33]

Table 2: Pre-Crisis infrastructure risk-adjusted performance in Australia (Q3:1995-Q2:2006)

	Average Annual Return	Annual Volatility (annualized standard deviation of quarterly returns)
Composite Infrastructure	22.4%	.16
Toll roads	25.7%	.24
Airports	8.1%	.31
Utilities	21.9%	.16
Stocks	12.9%	.11
Bonds	7.2%	.04

Sources: Based on Peng and Newell (2007)

The high infrastructure returns under normal economic circumstances should be strong evidence that rents in the sector have not really been significantly hurt by regulation. The institutional changes in the management of regulation associated with the restructuring of these sectors to open capital to the private sector were designed to attract capital. The best way to attract capital is to promise high rents. Moreover, any time a large utility or major transport company has been in trouble, it has been supported by its government through subsidies or tariff increases. The too big to fail argument so intensely discussed in the context of financial institutions seems to apply just as well to the negotiations strategies for regulatory decisions in the infrastructure sector.

The losers of the weakness in the regulation of financial and infrastructure services are the same: taxpayers and users. Nothing new under the sun. The main change may be an increase in the share of the total financing burden to be absorbed by tax payers, since the crisis is giving an opportunity to governments to finance subsidies demanded by producers to deliver services at relatively low average tariffs in view of the crisis. As unemployment rises and financing costs

[32] Estache (2006)
[33] RREEF (2007)

increase with perceived risk levels, populations are unlikely to be able to maintain current consumptions without some form of subsidy.

5.4 Increasing the transparency of the fiscal cost of the sector.

Why should effective regulation be more important after the crisis than it was before from a fiscal point of view? Lack of transparency and accountability for unjustified high cost was a source of inefficiency and unfairness before the crisis and will continue to be just as inefficient and unfair after the crisis. The big difference is likely to be the size of the fiscal cost of the inefficiency. More spending in the sector simply at a given level of subsidy due to excessive costs simply means higher fiscal costs.

If excessive operating and capital costs continue to be tolerated through weak regulatory assessments and decisions, the fiscal costs to the sectors are likely to increase. Thus the tolerance for high costs is not just inefficient; it is also unfair to taxpayers. Monitoring costs and cutting them where they are unjustified, means less need to subsidize consumption. Better regulation allows lower unit cost but also an increase in the share of production costs that can be absorbed by the final users and a reduction of the share that has to be passed on to the taxpayer.

The significant increase of the fiscal cost of infrastructure in the post-crisis era should be an opportunity to take a good look at the extent to which the weakness of regulatory capacity in the sector can be credited with the high costs and profit margins in the sector. This effort should include a look at the distribution of the cost recovery efforts among economic agents. Infrastructure projects tend to have very high price tags. This seems reasonable to uninformed observers since infrastructure projects tend to be large and costly. It turns out that a lot of research in the last few years has shown that this price tag tended to be excessive.[34]

5.5 Reforming procurement to cut costs

In many countries, the problem of high costs start at the procurement stage. Despite the huge progress in the theoretical assessment of procurement design, in most countries, many projects continue to be awarded and monitored under rules that do not meet the standards of transparency and accountability expected to prevail when the amounts involved provide strong incentive to wrong doing. The problem is serious and does not apply only to developing countries. Significant infrastructure related corruption cases have made it to the media and hence public

[34] See for instance the collection of papers by Premius et al (2008) but also Walter et al (2009) for water and Haney et al (2009) for electricity

opinion in various European countries--for instance Germany (the Siemens case) or in Spain (where many infrastructure projects have been used to finance illegally a political party). For the last 5 years, all major aid actors have finally been willing to seriously open their eyes to various forms of corruption that infect the infrastructure sector. Yet the policy actions that are being taken tend to focus more on headlines normative messages that on the crucial technical dimensions that should improve governance and accountability in the sector. The parallel with the failures of regulation, governance and accountability in the financial sector are hard to miss.

5.6 Restoring planning in a sector with long lived assets

From a strategic viewpoint, it is also important to consider the dynamics of the sector financing needs. Even if costs are kept under control, as coverage increases faster simply because public funding can be used more to invest and less to subsidize current consumption, governments should anyway anticipate future subsidy requirements associated with increased availability of a service. As larger shares of the population get access to many basic services, the increase in coverage rate occurs a lot faster than the increase in income as a result of the stimulus packages and improved regulation, the demand for consumption subsidies may increase.

From a fiscal management viewpoint, it is thus useful to point to the revenue consequences of successful regulation. If costs savings are larger than revenue increases due to the increased consumption basis, the tax base will shrink, fueling the fiscal deficit. It is indeed important to keep in mind that Finance Ministers face a strong dilemma. Since the sector is such a large share of the economy, it is a useful tax handle. Cutting cost in the sector boils down to cutting revenue from the sector. In Belgium for instance, water, electricity, gas and ICT are subject to a value added tax of 21%. Assume (realistically) that cost could be cut by 10%. If demand does not increase with the cost cut—and demand is unlikely too increase as environmental concerns are leading to improved demand management aimed at cutting consumption--, given that the sum of these activities represents about 10% of GDP, the reduction in cost implies a loss of revenue of about 0.5% of GDP. This order of magnitude may be the most intuitive explanation for the poor commitment of governments around the world to serious regulation.

The political economy perspective also points to the need to anticipate the continuation and possibly increase of demand on fiscal contributions to the sector. Since most of infrastructure services are viewed by populations as entitlements—the public service obligations of governments—and since they are regularly presented as key drivers of the investment climate of countries, it is unlikely that users will be asked to take on part of the burden of financing the sector commonly

imposed on taxpayers. Political stability and competitiveness are the benefit expected from a shift of the financing burden from users to taxpayers. It is at least as unlikely post-crisis as it was prior to the crisis.

5.7 Becoming honest about risk assessments and their fiscal effects.

Increased commercialization of the sector, including a larger role for PPPs in the sector are simply going to increase the burden on taxpayers unless regulation anticipates the risks of higher fiscal costs. These additional risks are likely to come from an increased risk of cream skimming by the private sector, an overgenerous system of guarantees and a excessive reduction in the performance incentives built in regulatory designs.

The main risk for taxpayers is allowing infrastructure ministries to package infrastructure projects to ease cream skimming by private actors. This is indeed a possible consequence of unbundling projects or sectors to increase the opportunities for PPPs. Cream skimming arises because the packages proposed to potential private partners are put together to reduce the number of obligations that represent risks of high cost with low opportunities for full cost recovery. This strategy is in contrast to traditional modes of financing of the sector in which, for instance, high cost rural areas are subsidized by low cost urban areas. Unbundling urban and rural infrastructure obligations, has often resulted in the private sector taking over the high profit urban obligations and the public sector keeping the low profit rural obligation, eliminating the intra-sectoral cross subsidies and demanding direct subsidies when full cost recovery in rural areas is politically and socially impossible. [35]

News summary of conferences and interviews with investors are in many ways more revealing than the more technical complex papers that look at the trade-offs between cross subsidies and cream-skimming in the sector. [36] They show that the concern with post crisis risk levels are leading potential private sources of financing to expect more focused, less risky projects, increasing the likelihood of cream-skimming. In other words, the concerns for risks, including the increased concerns for demand risk in basic services, are resulting in more selective investments of equity in the sector. As long as the bond market continues to have cold feet in the sector as well—and this is likely to be the case as long as the financial system will not have reduced the uncertainty of prospects for exotic instruments--, the projects and activities packaged for PPP will have to be

[35] It is seldom the case that the tax revenue from the taxation of PPP profits cover the rural subsidy needs.

[36] See Tenorio, V. and C. Idzelis (2009) for how the concerns for risks are leading investors to push for careful cherry picking in projejct finance and Estache and Wren-Lewis (2009) for an overview of the academic research showing among other things how sectoral unbundling can result in the end of intra-sectoral cross subsidies and the increased total demand for tax financing.

particularly attractive. Any source of uncertain costs to be addressed as part of service obligations commonly imposed as part of PPPs is likely to reduce the attractiveness of PPPs. Reducing service obligations for the private sector implies the end of common forms of intra-sectoral cross subsidies. The experience shows that when this happens, the taxpayers end up being the residual source of financing.

Tax payers may also be exposed to an increased burden as a result of an increased role of guarantees in efforts to attract the private sector. In January 2009, for example, the UK government introduced a guarantee program to stimulate the demand for asset-backed securities. The guarantees were made available four months later. The interesting aspect is that the program has not been that successful so far. The lack of success is revealing in terms of how major banks value these guarantees. The guarantees were apparently not enough or too costly to stimulate the market of infrastructure securities in the UK.[37] For the program to work, the fiscal allocation to the programs would have to increase. The cost to the taxpayers has to increase to cut cost for investors and increase the protection of their investments.

A third type of effort to attract the private sector with possible unexpected impacts on the fiscal sector stems from a progressive shift towards regulatory options that reduce the share of risks assigned to operators. In developing countries, the Guasch (2004) assessments of renegotiation experiences already pointed in that direction. They show that one of the most common occurrences associated with renegotiation is the increased share of cost of operators for which increases are automatically passed through to users or to the taxpayers through increased subsidies. This is what is meant in practice by a progressive switch from price cap to cost-plus regulatory regimes. It reduces the sense of risks for operators by reducing the share of the costs they need to absorb as part. Whether the cost is actually passed on to the users or to taxpayers is irrelevant to them. It should not be irrelevant from a fiscal point of view. The Latin American experience of the 1990s showed that the initial fiscal gains achieved through privatization only had a limited tenure as renegotiation often ended up in increased subsidies to absorb part or all of the underestimation of costs built in the initial regulatory contracts.[38] This fiscal risk also needs to be factored in the choice of the optimal regulatory regime.

But the increased fiscal risks do not only stem from poorly regulated effort to attract the private sector as a partner in the financing of infrastructure needs. Fiscal costs and risks also flow from the sizeable market of infrastructure projects direcly under public sector supervision. In the United Kingdom, the National Audit Office reported that 35% of the projects undertaken by ministries and agencies

[37] DLP piper (2009)
[38] Campos et al. (2003)

using the conventional procurement approach were completed at a cost exceeding the bid price.[39] In developing countries, despite growing private finance, official development assistance (ODA) is still playing an important role in infrastructure development. However, there is a growing volume of research showing that the official financial resources are used inefficiently, particularly as a result of insufficient competition in the public procurement systems. Estache and Iimi (2008) argue the design of procurement packages, especially lot size can be blamed for close to over 8% of excess costs.

5.8 Summing up

The main point of this discussion has been to show that it is essential to recognize that the role of government in infrastructure should not boil down to spend more and figure out how to get the private sector involved in co-financing these expenditures. Governments also need to be able to pick, price and monitor their project well. They need to deliver as fair and efficient regulators. The real challenge for the future is the need to achieve a more balanced approach to the support of the implementation of the various responsibilities of government in the sector.

Many governments and international agencies tend to underfund the efforts to improve the quality of public procurement and public delivery of the services which are not of interest to the private sector. For instance, infrastructure PPP promotion benefits from an extraordinary allocation of administrative financial resources in all major development agencies as well as earmarked resources for technical assistance in the preparation of transactions.[40] Public sector agencies in need to develop their ability to monitor the implementation of these transactions (i.e. regulatory agencies) or to deliver the activities that cannot be delivered through PPP (i..e public enterprises) do not enjoy equivalent levels of earmarked resources. Of course, traditional loan financing is still an important component of the portfolio of development agencies but many of these traditional loans enjoy a lot less preparation and supervision resources than they did 10 years ago and certainly than any activity aiming at promoting PPPs.

It seems reasonable to wonder if infrastructure service users would be today at least somewhat better off, had similar resources been allocated to seriously assess the opportunities to improve the quality of the public sector management of the sector components that are of no interest to private

[39] UK National Audit Office (2009)

[40] PPIAF (The Private-Public Infrastructure Advisory Facility) has been financing over the years an important number of studies and support to PPP transactions. In Fiscal Year 2009, it has a budget of about US$19 million.

investors.[41] The failure to support all institutions in the sector begs for an obvious parallelism with the mismanagement of securitization in the banking sector and the housing sector. The policy work in the sector needs to go beyond largely superficial discussions on the ground of the efficiency, equity and financial cost of the poor governance of the sector. Obviously getting the investment going is essential, in particular when service coverage is so low. However, ignoring the specificity of governance weaknesses in governments and banks in general and in bilateral and multilateral development agencies in the case of developing countries, should no longer be acceptable. We now have enough understanding of, and evidence on, how much they drive the excessive costs, distortions, delays and the inadequate renegotiations that have been observed in the sector to be able to be able to better tailor policies, and in particular economic regulation, to the specific needs of any country. [42]

6 Upcoming challenges

Besides the fact that, like any other sector, infrastructure subsectors are subject to the lack of predictability of fiscal allocations over the medium to long run, two main developing events are likely to impose new challenges to policymakers in the sector and shape their strategic options. The first is the central role that infrastructure is playing the adaptation and mitigations policies aimed are addressing climate change concerns. The second is the central role of infrastructure in regional integration efforts around the world.

6.1 The greening of infrastructure

The fact that infrastructure investments and policies are central to the implementation of any policy to deal with Climate Change risks and other major environmental challenges is relatively well internalized conceptually, much less so in practice. Addressing the coordination needs between infrastructure and environmental policies implies an effort to coordinate economic and environmental policies, regulations and institutions.

From a policy perspective, the desire to green infrastructure has also already forced intense debates on the optimal technological choices for transport and energy production. Significant subsidies have indeed been allocated to in infrastructure to stimulate its transformation into an environmentally friendly sector. The fiscal costs of the transformation efforts demonstrate the difficulty of coming up with rational coordinated policies. In the European context, for

[41] See Gomez-Ibanez (2007) for a review of progress on public sector management of infrastructure in the last 25 years or so.

[42] See Benitez and al (2010) for a longer discussion of governance challenges in the sector.

instance, Kutas et al. (2007) argue that the costs per ton of reductions in emissions achieved through public support to biofuels could purchase more than six tones of CO2 equivalent offsets on the European Climate Exchange. As the pressure to restore fiscal balance mounts, these are the type of incoherent policies that may need to be addressed by more careful ex-ante of policy coordination efforts.

The greening of infrastructure will also increase the relative importance of demand management in the policy agenda of infrastructure ministers. Demand management may end up being a crucial transitional instrument since it is likely that it will take quite a long time to adapt or discard existing infrastructure assets.[43] It is also very likely that prices will be a central role in this effort. Unfortunately, prices can have undesirable consequences that should not be ignored in particular in view of the political sensibility of the sector. Bushnell and Mansur (2006), for instance showed that the introduction of time-varying prices in three US states would have desirable environmental benefits but would do so with a wide dispersion of effects across customer types.

The discussion of the role of prices as a coordination mechanisms between environmental and infrastructure policies also illustrates the need to improve the coordination of regulation of the sectors. As infrastructure regulatory reform is implemented to address its important failures mentioned earlier, it should include a concern to increase the awareness of public and private operators as well as their customers or the growing environmental concerns. The regulatory reform agenda has recently been perfectly summarized by Tomain (2009), p951, in the context of the electricity sector: " *Where the old model encouraged consumption, the new model must encourage conservation. Where the old model fostered economic inefficiency, the new model must foster the efficient use of electricity. Where the old model was content with capital-intensive, centralized power production, the new model must promote distributed, small-scale power production. Where the old model was satisfied with burning dirty fossil fuels, the new model must expand the development, production, and consumption of alternative and renewable resources. Much of these gains can be realized through a renegotiated regulatory compact*."

A few countries are ahead of the game on this front. Pollitt (2008) provided early insights on the UK reform needs, making a strong case for changes in regulatory process in the UK simply because the UK enjoys strong economic energy regulators to build on. He does suggest however, that for other countries, other institutions may be more effective to reform long term policy goals towards energy and emissions to. He argues that competition and effective regulation of the residual monopoly powers could and should be a central element to all models in the sector in view of the positive outcomes achieved when competition and regulation worked well.

[43] Strand, J. (2010)

Pollitt's diagnostic points to the importance of the definition of the institutional framework needed to implement and enforce this new regulation. The traditional models usually divide the infrastructure and environmental responsibilities between multiple independent public bodies. For example, in most developed and developing countries, the incentive for firms to invest in the expansion of networks when needed is usually the mandate of sector specific economic sector regulators. The environmental risks such as toxic emissions and the damages to the environment are left to environmental agencies. Thus, at least two agencies, both arms of the state, are expected to generate a coordinated monitoring and sometimes enforcement framework to push the providers of key public services to deliver socially conscious outputs. The consequence of this separation is that multiple agencies with limited scope of responsibilities cannot internalize all the concerns that should be included into their rulings. Where industry-specific regulators limit the abuses of residual monopolies in the sectors, up to now, they have seldom been required to take into account long term concerns relevant to the climate change debate such as innovation and environment protection. Their main focus tends to be more quantity for a lower price. Similarly, the environmental agencies have very little concern for the need to expand coverage of services where these are needed. In fact, in some cases, they will prefer less coverage when services expansions are directly related to environmental damage. Their main focus tends to be quality, not quantity, and possibly a higher price to impact demand through the price mechanism and not just regulatory standards. The specific mandates of these uncoordinated independent regulators continue to be at the source of the risks of incoherence in public policy.

The empirical evidence on these risks is modest but reasonably robust. The efforts to deal with acid rains in the USA was a source of conflict between the states' economic regulators (Public Utility Commissions) and the states' environment regulators (Baron (1985)). Fullerton *et al.* (1997) modeling the effects of cost-plus regulation on the costs of sulphur dioxide compliance by electric utilities under the US Clean Air Act[44] (tradable emissions permits) validated the earlier observations and the high costs associated with the lack of coordination on objectives. They show that allowance trading incentives combined with traditional "cost-plus" treatment of spending on abatement can substantially increase the social cost of compliance. Similar conflicts have been identified elsewhere over 10 years ago. For instance, a study of electricity generation in England and Wales showed similar coordination problems (Acutt M. and C. Elliott (1999)). The lack of cooperation is thus a major risk to the success of CC policies that involve economic and environmental regulators.

[44] See http://www.epa.gov/air/caa/

6.2 The regionalization of large infrastructure projects

The second major challenge that governments need to deal with is the increased demand for regional integration. Regional integration has been on the agenda of the European Commission for quite some time now. But it has also been quite important in every developing region. Regional economic integration has been on Africa's political agenda since independence for instance. Yet, over 50 years later, although progress has been achieved, it is still on the agenda.

Infrastructure is now at the center of the integration debate as well. The European Commission has some specific sources of funding for large cross-national projects. All the regional development banks have similarly earmarked sources of funding for multicountry projects. Africa has even created a special institution, the New Partnership for Africa (NEPAD), and assigned to that institution the mandate to promote integration initiatives across infrastructure sectors. In a nutshell, the NEPAD action plans covering the policies needed to accelerate and achieve regional integration tend to turn around trade related policies, infrastructure investments and governance reforms. The trade related policies are mostly intended to facilitate transport of goods and services and include efforts to: (i) standardize documents for cross-border transactions and clearance of cargo, vehicles and people within each community, (ii) complete free trade areas and customs unions, (iii) to harmonize trade and industrial policies (i.e. tariff and non-tariff barriers to integration) to promote manufacturing. The infrastructure investment plans focus largely on high profile transport corridors, regional power pools and ICT backbones. The governance reforms focus on PPP-equivalent policies and aim at policies to: (i) encourage the private sector in the financing of intra-regional trade and cross-border investment, (ii) design and implement processes and institutions to increase transparency and accountability of decision making processes, including the independence of the judiciary and regulatory functions needed to stimulate investment in cross-border infrastructure projects.

The main lesson of the European efforts to achieve a regional coordination relying strongly on the creation of regional markets for all goods and services including transport and energy for instance is that the challenge is not just about investment. It is also about the coordination of policies, including infrastructure regulation. Coordination of policies may have to deal a very wide range of asymmetries between countries such as differences in access to finance, differences in ability to pay of the various populations. The politics of coordination are obviously essential and lead to under-investment in coordination. This underinvestment reflects what contract theory model as the concern for potential "hold-up" problems resulting from the limited commitment abilities of governments. Under-investment in electricity transmission may result in under investment in generation in one country in spite of its strong potential comparative advantages

and overinvestment in a second one concerned with the risk of being unable to import energy from the first one.

An additional challenge associated with regional integration parallels the challenge identified in the discussion of institutional coordination between environmental and infrastructure regulatory agencies. Most OECD countries have independent infrastructure regulators continues and countries outside the OECD has often been following that lead. Yet these regulators often have been set up with national policies in mind, with very attention paid to international coordination issues. These issues are dealt with ex-post in complex political contexts. For countries still in the process of working on the implementation of the regional integration of infrastructure networks, Auriol and Biancini (2009) show that the significant gains to design in a coordinated way ex-ante key regulatory decisions, on. They also suggest ways in which regulations can be coordinated ex-post under various transitional rules.

The regional integration challenge is however not only about efficiency. It is also about equity—i.e. extent to which the gains from integration will be distributed fairly across countries--has never been too far, at least in theory. The experience from trade integration efforts shows that specific redistribution mechanisms are needed, at least during the transition period in which the growth payoffs of integration accrue to specific producers or regions, materializing in employment and wage differentials which eventually reduces or eliminates some of initial distributional distortions. In electricity for instance, tariff rebalancing usually takes place when energy markets have become more integrated.

6.3 Summing up.

Even if the awareness of the nexus between infrastructure on the one hand and environment and regional integration on the other, the complexity of the associated regulatory and institutional issues have not yet been fully internalized in the policy discussions. Yet, they are essential, not only to the efficiency and fiscal consequences of coordination efforts but also to their equity consequences. As soon as equity costs become excessive, the experience also shows that the political viability of the policy changes attempted is threatened.

7 Concluding comments

The initial enthusiasm for the return of infrastructure in the stabilization tool kit of macroeconomists is not only somewhat hiding the important upcoming challenges mentioned earlier. It may also have pushed policymakers to underestimate, at least initially, the complexity of the environment in which the

policy has been decided and the importance of some longer term fiscal and policy consequences of their stimulus plans.

The complexity of the environment stems from the impact of a continued deficit on the debt stock of countries. By the mid-spring of 2010, to a large extent as a result of the Greek crisis, the stock of debt in OECD countries returned to the forefront of the policy debate. This return, in turn, demanded efforts to control deficits. The temptation to review the commitments to scale up infrastructure expenses is strong. As it had been 30 years ago, infrastructure is an easy target for quick high impact expenditures. The odds of a repeat of history are high. The new Cameron-Clegg British government may have been the first to decide on a reversal of commitments to the sector made less than a year earlier. The risks associated with this return of history are just as high. Infrastructure was then excessively cut as part of structural adjustments aiming at reducing structural fiscal deficits. It took a generation to recover from that mistake. The initial indications are that policymakers around the world are trying to avoid a repeat of history, including in Europe and in the US where the stock of debt is becoming the most unsustainable.

The complexity of the environment in which infrastructure policy is being conducted also stems from a recurring tendency to underestimate the much longer term recurrent expenditure commitments associated with infrastructure investment. Infrastructure investments and assets need to be operated and maintained. Increasing infrastructure stocks implies increasing the commitments to sustain operational and maintenance expenditures at levels that will avoid the deterioration of the assets. Since most of the stimulus plans are based on 2-3 years horizons, it is very likely that these longer term consequences have been ignored. In an environment in which the stock of debt is defining the longer term level of deficits, there should be a concern that a trade-off between long term asset quality and medium term fiscal viability will emerge if maintenance has to be cut to restore medium terms fiscal balance.

The natural solution to the second issue is to rely more on the private sector who has fewer reasons to cut on recurrent expenditures. Yet, this option has always been limited in the fast and may actually be even more limited for the foreseeable future, depending on how the financial sector evolved. In the best case scenario, the relative importance of the private sector in infrastructure may reduce some, but clearly not all the fiscal responsibility for infrastructure. The private sector will never pay for subsidies, unless these are cross-subsidies. But the end of what can be seen as a leverage crisis may help quite a bit. Unfortunately, since it is not clear when leveraging will be a desirable option again, the public sector will continue to be the main actor in infrastructure for the foreseeable future.

Ultimately, the drivers of the basic challenges of infrastructure have not changed much. Uncertainty has increased for now and hence complexity. Whether high infrastructure investments continue to be on the agenda or not in an increasingly constraining fiscal environment is not the real issue. The real issue is if cuts are needed whether they will follow some analytical rigor that accounts for real bottlenecks and for opportunities to cut costs without changing physical commitments. This challenge will be driven by the ability of governments to address the many institutional weaknesses they have demonstrated in the sector. Improved project selection, improved costing, improved regulation, improving coordination within the sector and across sectors, and improved monitoring of outcome are easy goals to set. Their implementation boils down to political will to deal with the governance problems of the sector. And this will has not been a defining characteristic of the sector in the past. Neither in developing countries, nor in developed countries.

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