



A state-of-practice survey on managing FX exposure in project companies, construction companies and SMEs

Managing
FX exposure

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Abstract

Purpose – Foreign exchange risk might exist in any situation where a business' operations can be affected by changes in exchange rates. The objectives of the present paper, are therefore to identify the current state-of-practice in managing foreign exchange exposure.

Design/methodology/approach – To present a wide perspective the analysis includes questionnaire surveys regarding foreign exchange exposure in three different sectors. The three sectors are: international special purpose companies engaged in project financing; large-scale international construction companies; and highly export-oriented small and medium-sized enterprises, all based in Singapore.

Findings – The analysis demonstrates that all three sectors are exposed to a degree of foreign exchange risk. The paper also demonstrates that foreign exchange exposure is not as very well managed as it might be.

Practical implications – The three sectors might have different needs in protecting their cash flow from foreign exchange exposure but the analysis could help them learn from one another in identifying common trends and drawing universal conclusions where appropriate.

Originality/value – To improve on the presently identified state-of-practice, various foreign exchange risk mitigation techniques more commonly used, their perceived effectiveness, and factors of concern in using them, are discussed.

Keywords Currency risk control, Foreign exchange exposure, Hedging techniques, Public private partnerships, Small to medium-sized enterprises, International construction firms, Construction industry, Hedging

Paper type Research paper

1. Introduction

A world of international trade leads to a change in relative currency values and, as a natural consequence, subsequently to foreign exchange (FX) risk

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exposure (Ross *et al.*, 2000). Since the collapse of the Bretton Woods System in 1971 following the US Government's suspension of convertibility from dollars to gold, FX rates have become significantly volatile (Meese, 1990). Over recent history this volatility has increased because of economic and political difficulties and higher sovereign default rates. Companies' exposure to FX risk will also be likely to have increased because of the enhanced proportion of exports appearing in their overall sales as foreign trade worldwide expands (Jorion, 1990). It has been suggested that hedging FX risk can contribute to minimizing overall FX exposure (Loderer and Pichler, 2000) and increase firm value (Stulz, 1984) in such circumstances.

FX risks result from the uncertainty of foreign currency values, since the costs and revenues involved are often at least partly based on different foreign currencies (Cooley and Peyton, 1991). Currency exposure can also arise from the mismatch of costs and revenues, as in the case of a contractor, for example, being driven by operational and financial choices, with Demacopoulos (1989) arguing that FX risks exist even before a contract is signed because of FX volatility between bid and award dates. As a result, the contractor may receive less revenue than expected; or the off-taker may have to pay more than the anticipated amount for the service provided (Block and Hirt, 1997). Consequently, any party would be advised to assess its economic FX exposure in order to protect the resultant costs and revenues from subsequent unanticipated fluctuations.

Especially, export-oriented economies are highly susceptible on FX fluctuations. Construction companies operating outside the domestic market need to manage their FX exposure to protect profits. Both magnitude and direction of FX fluctuations are difficult to forecast and are outside the control of any construction company. The paper elaborates the risk mitigation techniques more commonly used by construction companies, special purpose companies and SMEs. To present a wide perspective the analysis includes questionnaire surveys regarding FX exposure in international special purpose companies engaged in project financing; large-scale international construction companies; and highly export oriented small- and medium-sized enterprises, all based in Singapore.

The construction sector in Singapore plays a key role in the economy with a total volume of S\$25.7 billion in 2010. The annual construction export value is around S\$2 billion. The "year on year" increase from 2009 to 2010 in construction demand was 14 per cent. The total estimate of construction demand in 2011 is S\$28 billion, with around 55 per cent of this stemming for the public sector.

The argument for emphasized hedging FX exposure was initially developed by Modigliani and Miller (1958). These renowned authorities argued that the shareholder can manage relevant exposure themselves through diversification of their portfolio and that the additional cost of hedging would lower the individual firm's value. However, at their time of writing (now half a century ago), the greater proportion of corporate equity was owned by individuals who, as shareholders, might typically be expected to lack the requisite detailed knowledge regarding hedging opportunities to act contrary to the way Modigliani and Miller suggested. Currently, investment managers do have an informational advantage over individuals, so the situation now of institutional shareholders owning, in all of the developed world countries, the majority of corporate equity (the UK figure has been estimated variously at 75-90 per cent), means the relevant expertise is now there. With the additional information now available to them,

institutional shareholders are able to hedge efficiently. Not surprisingly, therefore, researchers such as Eun and Resnick (2007) have established that hedging can provide important protection by limiting the possibility of financial repercussions on the business.

The FX exposure can be defined in transaction, translation and economic exposure terms (Bartram *et al.*, 2005; Eun and Resnick, 2007). “Transaction” exposure is the extent to which the income from individual transactions is affected by fluctuations in FX values in the short term. It thus covers obligations of purchase or sale at pre-agreed prices, or the borrowing or lending of funds in foreign currency. Contrarily, “translation” exposure is the impact of currency exchange rate changes as reflected in the reported consolidated results on the company’s balance sheet. Finally, “economic” exposure is the extent to which future earning power is affected by changes in relevant exchange rates.

Short-term FX exposure can be hedged in the market. However, economic FX exposure (with its focus on the long term) is more difficult to mitigate, with Boey (1998), for example, having stated that FX risk and political risk are both rated as equal in priority by foreign lenders and equity investors, such that government policies influence both FX risk mitigation opportunities and relevant instruments. Meanwhile, Demacopoulos (1989) has described the barriers encountered in general construction projects as including: currency restrictions; capital market access restrictions; restrictive government procurement; capital and exchange controls; and government-aid programmes that favour local contractors. All such barriers, and more, are relevant to the even more complex (i.e. compared to “conventional” construction contracts) nature of public private partnership (PPP) projects, simply because the concessionaire contract additionally includes the whole operation and maintenance period of the project. Furthermore, PPP projects, by their very nature of being typically infrastructure enhancing, invariably require a significant investment, and because parties to the concession can originate from myriad countries inevitably involve more than one currency (Block and Hirt, 1997). The following sections will describe the present state-of-practice to reduce FX exposure in the three sectors the paper examines.

2. Research method

Any academic enquiry requires a philosophical framework that indicates how the object research should be carried out. This is its research paradigm, regarding which there are two main schools of thought: positivistic and interpretivist (alternatively, phenomenological) (Hart, 1998). In the present case, a positivistic approach would suggest the goal of the enquiry would be the discovery of an underpinning theory, based on unique empirical research that would reflect a “reality” independent of the researchers themselves. In this, that “independence” would make the assumption that the very act of investigation has no effect on that which is actually being investigated (Creswell, 1998).

Such an approach would initially seem inappropriate in the present case, since as Collis and Hussey (2009, p. 56) have proposed, in the positivistic case, “[...] theories provide the basis of explanation, permit the anticipation of phenomena, predict their occurrence and therefore allow them to be controlled”. The present paper proposes to develop no theory whereby fixed and certain laws bind cause to effect. Nevertheless, in its assumption that phenomena can be measured (such that positivism has

to be associated with quantitative methods of analysis), the approach does suggest some measure of present relevance.

The alternative, interpretivist, view proposes that “reality” is subjective rather than objective since it is shaped by one’s perceptions, such that it is impossible to separate what actually exists in the world from what is in the researcher’s mind regarding it. “Therefore, the act of investigating [...] reality has an effect on it [...] and whereas positivism focuses on measuring [...] phenomena, interpretivism focuses on exploring the complexity of phenomena with a view to gaining [...] understanding” (Collis and Hussey, 2009, p. 57). Therefore, the interpretivist view adopts a range of investigatory methods in order to, “describe, translate and otherwise come to terms with the meaning, not the frequency of [...] phenomena” (Van Maanen, 1983).

Given that the paradigm adopted depends both on the nature of the research and on the personal assumptions of the researcher, elements of an interpretivist philosophy also seem appropriate in the present case since this can recognise that people may interpret situations differently (Saunders *et al.*, 2003), and this could obviously affect their response to a questionnaire requesting information regarding their knowledge of, and use of, FX mitigation instruments. It is therefore anticipated that different participants in the present enquiry will, given their unique circumstances, not necessarily perceive their approach to FX risks identically. This could well be reflected in the researchers’ own view regarding the suitability of specific FX mitigation instruments such as to influence interpretation of the present findings.

Therefore, a more flexible approach to the object research that does not totally reject positivism is adopted for the present enquiry, and which accordingly presents something of a “hybrid” paradigm. Thereby, it becomes possible to take into account the overall subjective nature of the research whilst still holding out the possibility of objective quantification of the questionnaire responses, so as to take on board Jankowicz’s (2005, p. 111) suggestion that a “deductive approach is inappropriate where the phenomena in question have subjective capabilities”.

3. Survey analysis and evaluation

The present study analyses three questionnaire surveys regarding FX research conducted by Nanyang Technological University. The objective is to identify the various FX risk mitigation techniques more commonly used and to investigate both their perceived effectiveness and the factors of concern in using them.

Survey 1 is an international enquiry via e-mail where a total of 50 questionnaires was received from the 500 contacts approached. Of these respondents, 48 per cent are from the financial sector, 36 per cent are investors, 36 per cent act as consultants and 14 per cent are contractors. Some respondents act in more than one capacity, so the total exceeds 100 per cent. Since 38 per cent of survey participants declared themselves not exposed to FX risk and could consequently not comment upon it, 31 valid responses are used for the purpose of subsequent analysis. The survey focuses purely on PPP projects with anticipated FX exposure during the relevant concession, the main concern then being to mitigate economic FX exposure during the whole concessionary period. Given the specific nature of PPPs, the concession period can extend to several decades.

Survey 2 focuses on costs and revenues during the construction period involved in purely international (i.e. not PPP) large-scale construction projects, hence involving

the participating companies in much shorter-term FX exposure than the PPP companies previously surveyed. The survey includes 25 valid responses (two results having been rejected as spurious) from the 284 mailed out (so a useable response rate of 8.8 per cent), from construction contractors and developers having a portfolio of large-scale overseas projects.

Survey 3 includes 50 valid responses from 150 targeted businesses and presents a questionnaire-based survey exploring the FX risk hedging behaviour employed by SMEs based in Singapore, with the size of the companies surveyed varying from 50 to 250 employees. Since Singapore has a strong reliance on international trade, most of the companies surveyed consequently face economic FX exposure. Survey 3 is expected to deliver different results to surveys 1 and 2 because of the very nature of the businesses concerned.

Surveys 1 and 2 had lower response rates compared to survey 3. However, in a mail survey of randomly selected respondents, without pre- or post-mailing contact, response rates can be less than 15 per cent (Malhotra and Birks, 2007). Elsewhere it has been commented, “response rates of 10% or less are not uncommon” (Collis and Hussey, 2009, p. 193) for the type of survey instrument involved. Additionally, in the case of survey 3 the response rate was increased by two follow-up calls to achieve its eventual 33 per cent return.

Table I summarizes the survey analyzes with respect to the target group, the focus of the questionnaire and response rate as regards all three surveys.

The present paper will comment in the subsequent sections on the three surveys’ findings, regarding a number of significant topics.

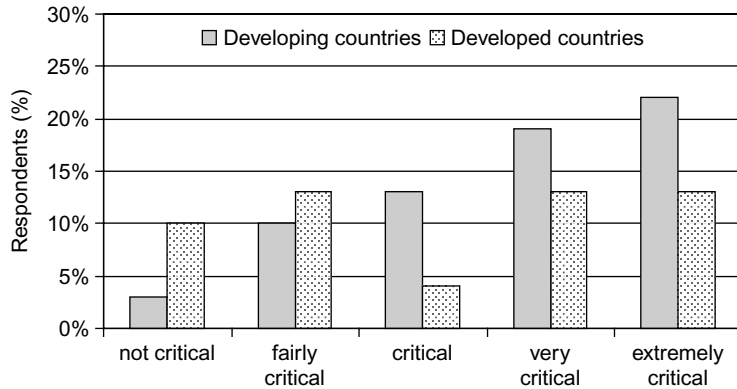
3.1 Revenue or expenses denominated in foreign currency

All three surveys test the ultimate impact of FX exposure on the business. Figure 1 relates to survey 1 and shows the impact of FX exposure on project success, here distinguishing between projects in “developing” and “developed” countries as defined by the United Nations Statistics Division. In most PPP infrastructure projects investors face economic FX exposure to their capital expenditure, in contrast to those cases in which the necessary funding is available domestically. Additionally, economic FX

	Survey 1	Survey 2	Survey 3
Target group	FX exposure in long term PPP concession projects	FX exposure in international large-scale construction projects	FX exposure in SMEs with reliance on international trade
Focus of questionnaire	Mitigation of economic FX exposure during the whole concessionary period	State-of-practice in mitigation of short term FX exposure during the construction period	State-of-practice in mitigation of short term FX employed by SMEs. Analysis of expected differences in the results to surveys 1 and 2 because of the nature of the businesses concerned
Structure	500 questionnaires with 31 valid responses	284 questionnaires with 25 valid responses	150 questionnaires with 50 valid responses

Table I.
Survey analysis

Figure 1.
The impact of FX
exposure on project
success (survey 1)



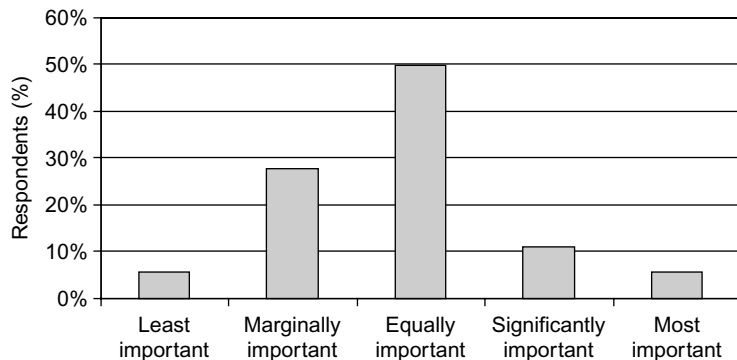
exposure can arise from revenue mismatches with the currency of tariff revenues frequently being different from that of O&M costs and financing costs.

Hence, were the project to be located in the developing countries, 54 per cent of the respondents rate the resultant FX risk as being from “critical” to “extremely critical,” whereas only 30 per cent rank it as being within these two categories were the project to be located in the developed economies. This observed difference results from the comparative availability of a variety of risk mitigation instruments.

Survey 2 sought to test if overseas project involvement automatically means a very high FX risk exposure for the involved company. The results indicate that 30 per cent of the respondents “strongly agree” and 52 per cent “agree” with the contention. However, the 18 per cent of respondents able to mitigate their FX exposure suggests disagreement with the proposition as being relevant to their own situation. Since the total of responses is 100 per cent, it is obvious there is no strong effect being recorded with the proposal.

Survey 3 assesses the level of importance placed on FX risk exposure compared to other operational risks that companies might face. Figure 2 provides a general indication that 50 per cent of respondents rank FX risk as “equally important” to these other risks with another 15 per cent viewing the risk as “more important” when compared to other operational risks faced by the company.

Figure 2.
The degree of importance
of FX exposure compared
to other company
operational risks (survey 3)



Survey 3 additionally measures the impact of FX exposure on the expenses and revenues of the company. Figure 3 analyses the responses received and indicates that, for the greater number of respondents (i.e. revenue, 50 per cent; expenses, 68 per cent), FX exposure is perceived to be 20 per cent or less as regards revenues or expenses.

Thus, all three surveys indicate possession of too small a hedging position as, not surprisingly, being a strong reason for companies not to hedge their FX exposure. Even so, survey 1 indicates that 47 per cent of respondents possess projects with a loan amount, in total, of over US\$50 million exposed to FX risk, as shown in Figure 4.

3.2 The practice of FX risk management

Mitigation of FX risk is important in ensuring stable cash flows, and survey 2 reveals that 74 per cent of responding firms practise FX risk management. A proportion (40 per cent) of these respondents “always” attempt to manage FX risk; a further 55 per cent will “usually” do so.

Survey 3 indicates that 36 per cent of respondents hedge their FX exposure. This result is surprisingly low. However, SMEs by their very nature are small and would therefore likely be considered to lack the degree of FX exposure mitigation expertise available to larger enterprises. This contention is supported by Berkman *et al.* (1997), who found 53 per cent of large firms (market equity value greater than US\$250 million) using derivatives but only 36 per cent of small firms (market equity value less than US\$50 million) doing so.

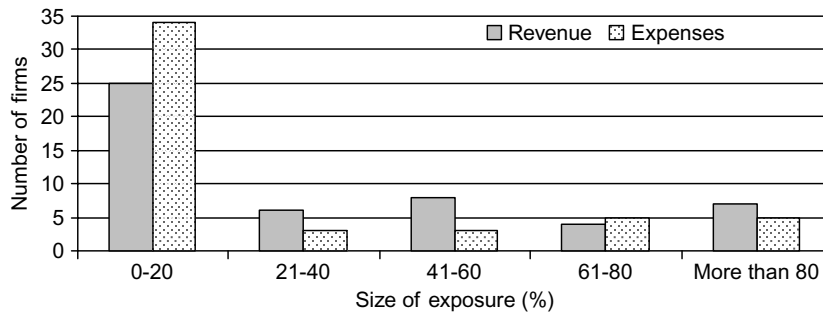


Figure 3.
The proportion of revenue and expenses denominated in foreign currency (survey 3)

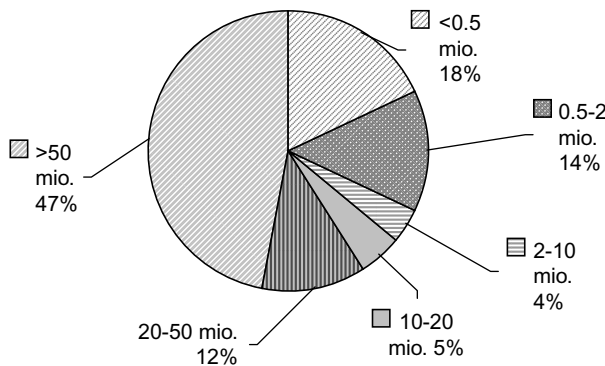


Figure 4.
The percentage of loan amount exposed to FX risk (in US\$ million) (survey 1)

Figure 5 shows the proportion of those hedging regarding revenue or expenses denominated in foreign currency. It suggests that, the smaller the exposure, the more likely it is that hedging will occur. Further, the histogram indicates that, with increasing FX exposure, it is more likely that hedging exposure on expenses will occur compared to revenues. However, most materials are imported into Singapore and FX exposure is consequently high for SMEs.

3.3 Reasons for not hedging FX exposure

Survey 1 establishes the main reason for not hedging as being that the amount of FX exposure is considered too small to bother with in developed countries, although a clear difference emerges in the developing country case, as indicated in Figure 6. Alternatively, consideration of shareholder interests might prevent hedging strategies; or the cost of hedging might simply be deemed too high. Further reasons applicable to developing economies only are: the necessary knowledge about hedging instruments is simply not available and suitable hedging or other financial instruments simply do not exist.

The responses in survey 2 indicate that construction company managers feel they need to manage FX risk but that there is no necessity for them to employ relevant staff, such as business or finance professionals, who are specifically trained in this area.

Figure 5.
The proportion of those hedging with revenue and expenses denominated in foreign currency (survey 3)

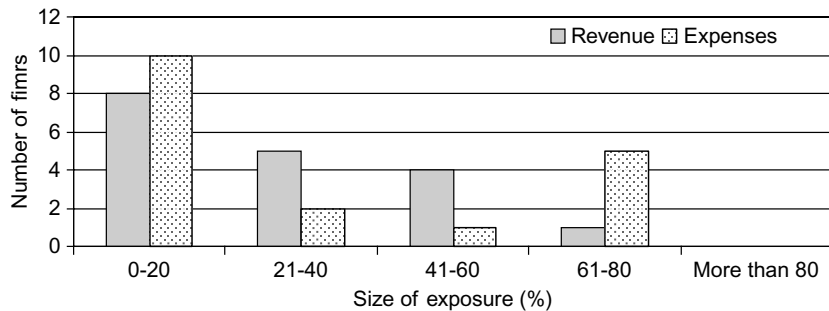
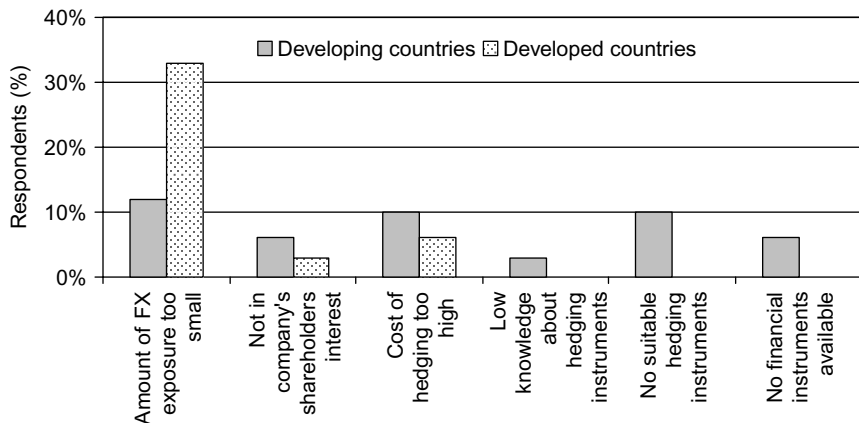


Figure 6.
Reasons for not hedging FX exposure (survey 1)



Only 48 per cent of respondents have employees specialised in the relevant skills; whilst 24 per cent of respondents indicate a lack of FX risk mitigation expertise; and 29 per cent consider they lack assistance and support from financial institutions, in their attempts to reduce their exposure. “Other” problems cited by 38 per cent of respondents include: regulatory restrictions; the high cost of hedging; and parent company controls (the total here summing to more than 100 per cent because some of the respondents chose more than one option)[1]. Furthermore, it is deemed difficult to control basis risk in ensuring the timing and amount of transactions during project execution. In other words, it is difficult to determine when clients will pay even when this is within the payment period stated in the contract.

Survey 2 delivers similar results regarding the size of hedging contracts negotiated as survey 1, as Figure 7 shows.

Thus, if revenues and expenses are denominated in the same currency, the effects of FX rate movements are deemed to be offset. Similarly, gains and losses can be offset if currencies are correlated. However, FX exposure modelling is difficult, especially if several currencies with correlations are relevant to the company, and in such a case the size of FX exposure then becomes difficult to determine. However, in contrast to survey 1, in the present (hence survey 3) case, none of the respondents feels the cost of hedging to be so high as to deter them from engaging in the activity. This observed difference may be explainable by the time duration of the hedging tools utilised. Thus, PPP projects have much longer time periods compared to SMEs and therefore significantly higher hedging costs. Only 4 per cent of respondents indicate a lack of appropriate products constitutes a deterrent in their attempts to mitigate their FX risk. (As elsewhere, the ability given respondents to select more than one reason explains why the total adds to more than 100 per cent.) Further aspects of derivative practices and policies have been studied by Mian (1996) and Geczy *et al.* (1997). Both enquiries showed that disclosure aspects of derivatives have a potential impact on a company’s use of derivatives.

3.4 Use of hedging instruments

Survey 1 tested attitudes regarding the most suitable hedging instruments that can be utilised. In this context, Figure 8 shows that currency swaps and forward agreements are identified as the most appropriate vehicles amongst the available techniques.

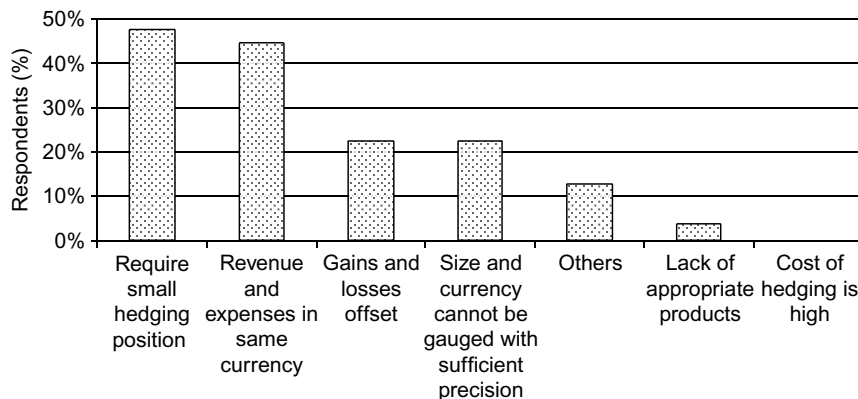


Figure 7.
Reasons for not mitigating
FX exposure (survey 2)

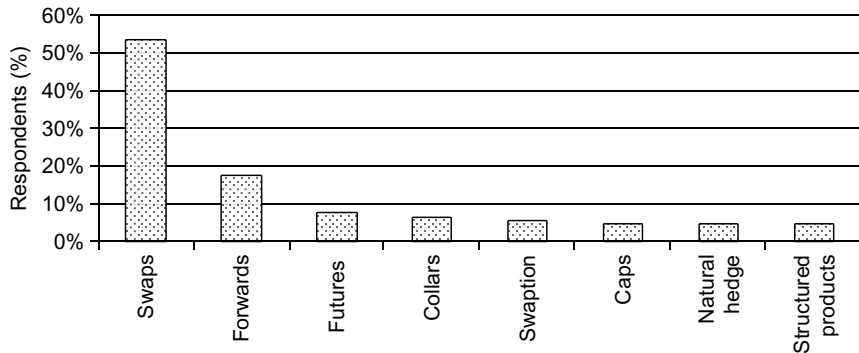


Figure 8.
Most suitable hedging instruments (survey 1)

It is obvious from this presentation that the majority (53 per cent) of respondents use swap arrangements, whilst the second largest group (17 per cent) use forward contracts, to hedge their FX risk. Both instruments are simple in execution and hence not surprisingly frequently used in practice. Furthermore, forward market hedges and currency swaps are low cost instruments when compared with the “option” alternative, which in addition to involving high cost is also both more sophisticated and requires enhanced knowledge of the relevant procedures. As is evident from the pie chart, alternative possibilities such as caps, swaptions, collars and structured products are implemented by only a minority of respondents.

Somewhat surprisingly, futures appear to be used by only a small number (7 per cent) of the survey respondents, who tend, rather, to hedge their position by using financial derivatives. Lioui (1997) found that forwards and futures give identical results regarding their hedging effectiveness in terms of volatility minimization, although forwards consist of an additional interest rate risk. Therefore, prices between forwards and futures should differ if interest rates are stochastic (Cox *et al.*, 1981; Richard and Sundaresan, 1981; Duffie and Stanton, 1992). So if interest rates are positively correlated with futures prices, futures will generate gains when interest rates are increasing; but generally, when futures prices are positively correlated with interest rates, futures will be more expensive than forwards. Conversely, when futures prices are negatively correlated with interest rates, forward contracts will be more expensive. Another reason for the observed unpopularity of futures could be that forward contracts, representing an agreement to exchange currencies at a future date although at a price established today, are simple in both utilization and implementation. Furthermore, forward agreements are over-the-counter derivatives, which are written by banks. They are tailored contracts regarding both amount and maturity date, and require a good credit standing with a bank. This could be the reason why forward market hedges are deemed more suitable than futures contracts.

PPP projects often utilise several risk mitigation instruments provided by the relevant host government. Thus, survey 1, for example, demonstrates (as in Figure 9) that FX risk can be mitigated via local currency loans in the case of 35 per cent of the questionnaire’s respondents, followed in order of popularity by tariff adjustment formulas, guarantees and portfolio diversification. Furthermore, this survey reveals that 24 per cent of its respondents have received no governmental support such as to mitigate their FX risk exposure.

Somewhat interestingly, however, survey 2 delivers a different perspective on hedging techniques when applied in a (non-PPP) construction project context. The questionnaire in this case tested the frequency of usage of possible FX hedging instruments in terms of being either “always” or “usually” used. Figure 10 shows currency matching, borrowing in local currency and forward market hedging to, sequentially, be the most important instruments to reduce FX exposure as always utilised by international construction companies operating out of Singapore.

The matching of currency mainly involves the balancing of currency receivables against currency payables. But whilst borrowing in local currency eliminates FX exposure, it appears to be often associated with a higher price in terms of interest cost.

By way of explanation at this point, “asset and liability management” means the maximizing of asset positions in strong currencies and liability positions in weak currencies; and “project selection” refers to targeting projects in countries where the exchange rate regarding the local currency is stable. An alternative to mitigate FX exposure is to change the source countries for such as materials and equipment according to exchange rate fluctuations. Thus, if it becomes more expensive to import from a certain country, companies may change their sourcing to another country if this benefits from a more advantageous exchange rate.

The ranking of usually used hedging instruments revealed from survey 1, shown in Figure 11, is similar to the “always applied” hedging instruments presentation of Figure 10.

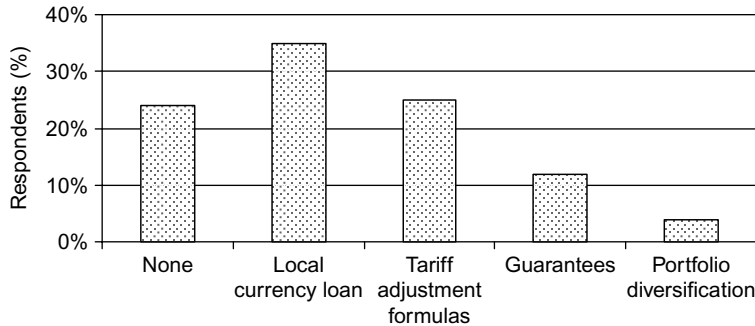


Figure 9.
Risk mitigation instruments provided by the government (survey 1)

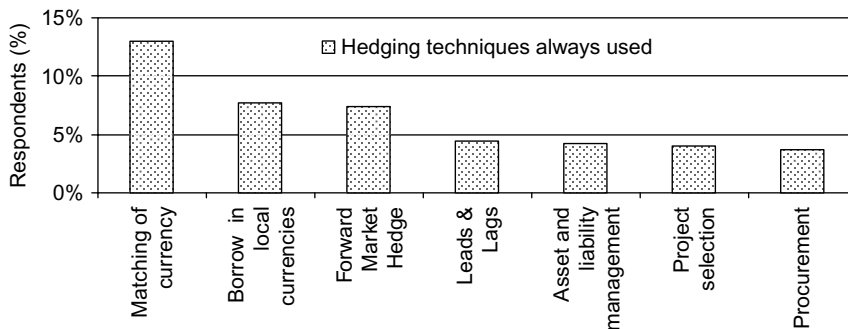
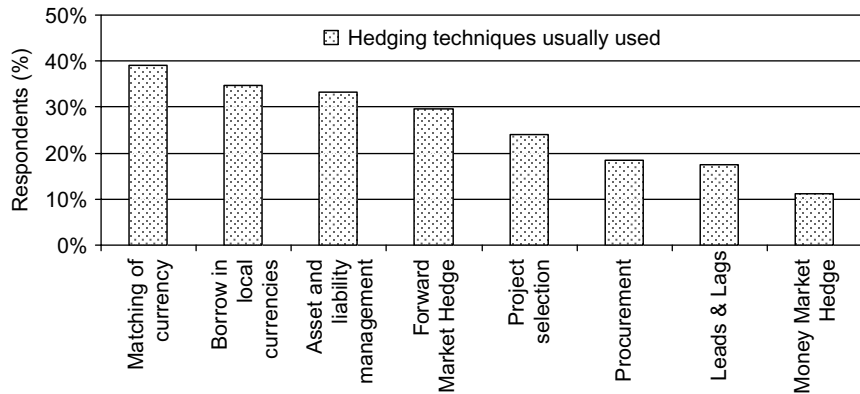


Figure 10.
Ranking of hedging techniques that are always applied (survey 2)

Figure 11.
Ranking of hedging
techniques that are
usually applied (survey 2)



Hence, respondents rank matching of currency as their most favoured risk mitigation instrument, followed (sequentially) by: borrowing in local currencies; asset and liability management; and forward market hedging. The most cost-effective measure is perceived to be to structure a natural hedge to mitigate exchange risk in the project. In this case, the exchange rate is hedged by matching the revenues and expenses of the project.

Somewhat surprisingly, survey 2 provides no mention of the use of the futures and swap markets, although this finding does, nevertheless, support the limited use of futures identified in survey 1. The reason for this preference could possibly be the aspect of less flexibility in the case of futures; additionally, they tend to be of smaller monetary amounts when compared to forward agreements; and, finally, futures are exchange-traded derivatives and only available in the major currencies. They are standardized and mature on a limited number of specific dates each year and that might be considered somewhat inflexible in some demand situations.

Currency swaps (which are temporary exchanges of money between two parties), appear to be relatively unpopular in construction projects. Hence, survey 2 demonstrates that 60 per cent of the respondents use local bank borrowing and internal working capital to finance their overseas projects. The duration of the available FX exposure mitigation instruments is much shorter than the life of a typical PPP project, and in such a situation internal working capital enables businesses to manage their capital requirements internally through such things as advanced payments from clients in order to (at least partially) cover the construction costs incurred.

Survey 3, via Figure 12, provides an interestingly different perspective on the usage of derivative products compared to surveys 1 and 2, since it establishes forward agreements to be the most favoured hedging instrument amongst SMEs (the results being based on the 18 respondents who actually do hedge their FX exposure).

This is, nevertheless, a similar result to that produced by previous research (Grant and Marshall, 1997; Bodnar *et al.*, 1996; Marshall and Bansal, 1992). Additionally, a study by Phillips (1995) found that 63 per cent of its respondents used derivative contracts, derivative securities or both. The reasons for using derivatives most favoured by respondents was for the purpose of financial risk management (some 71 per cent), while nearly 67 per cent of firms used them in conjunction with obtaining funding and 21 per cent for investment purposes. However, the survey presented the

view of derivative practices presented only by treasury professionals, so it might not be comparable with presently reported findings.

The SMEs approached in survey 3 also applied swaps – subsequently found to be the most common aid to structured finance (as previously revealed by survey 1). However, options and futures would appear to have very limited application in PPP projects and construction projects. Both instruments require access to a trading environment, which makes the process of hedging complex. As opposed to the situation faced by construction and special purpose companies, SMEs might well find access to this necessary trading environment convenient and therefore make use of the relevant instrument.

3.5 The perceived effectiveness of risk mitigation instruments

Previous studies have tested for the most important objectives in hedging policies (Nance *et al.*, 1993; Bodnar *et al.*, 1996; Mallin *et al.*, 2001). Nance *et al.* (1993) found that a focus on the stability of reported earnings is inconsistent with the widely held view that focusing on the cash flow benefits of hedging as being more beneficial; whilst Mallin *et al.* (2001) showed that firms worry most (53 per cent) about the fluctuations in accounting earnings. The second most important factor (38 per cent) was the objective of minimizing fluctuations in economic internal cash flow. Only 6 per cent of firms cited managing the market value of the firm as their most important hedging strategy; and only 3 per cent mentioned their objective as being to manage balance sheet ratios.

To complete the paper’s findings, the commentary is now focused on the three surveys’ testing of the perception of derivatives’ effectiveness in hedging FX exposure. Such effectiveness, it is found, is largely dependent on the project’s location, as shown in Table II.

In survey 1, 18 per cent of respondents with projects in developed countries rate hedging instruments as “effective” and 12 per cent as “very effective”. The relative popularity between developed and developing countries is different, however, moving in completely different directions. Thus, in the developing country case, the 6 per cent that view hedging instruments as “effective” increases to 10 per cent that find them “extremely effective”; in the developed country situation, the numbers reduce from 18 per cent to only 4 per cent, respectively. This rating potentially indicates a need to enhance the availability of derivatives to protect those projects carried out in developing countries from potential FX exposure. It may also indicate that, in the developed country case, their better developed financial markets make available more effective mechanisms to reduce FX exposure, and that, in any event, would be expected to be less extreme.

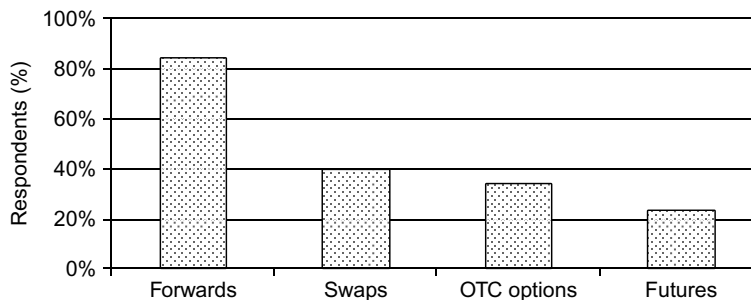


Figure 12.
The most common instruments used to hedge FX exposure (survey 3)

Perceived effectiveness of risk mitigation instruments	Not effective at all (%)	Fairly effective (%)	Effective (%)	Very effective (%)	Extremely effective (%)	
The effectiveness of derivatives as a hedging strategy	2	4	6	8	10	Developing countries
	4	4	18	12	4	Developed countries
The effectiveness of guarantees in FX risk mitigation	6	4	10	16	4	Developing countries
	4	10	12	6	6	Developed countries
The effectiveness of tariff indexation in FX risk mitigation	2	8	14	14	4	Developing countries
	2	4	18	6	7	Developed countries
The effectiveness of local currency loans as FX risk mitigation	0	0	17	12	22	Developing countries
	0	0	5	4	38	Developed countries
The effectiveness of portfolio diversification in FX risk mitigation	6	10	16	8	0	Developing countries
	3	16	10	6	3	Developed countries

Table II.
Perceived effectiveness of risk mitigation instruments

Table II further illustrates the perceived effectiveness of guarantees in mitigating FX exposure. From this it can be observed that respondents having projects in the developed countries rate effectiveness in this case much lower than in the case of derivative use.

It may be observed that, in the developed country case, the greatest number of respondents rate guarantees as “effective,” although only marginally ahead of their being merely “fairly effective.” Contrarily, in the developing country case, the most popular rating is “very effective.” However, since guarantees regarding FX exposure come in a variety of forms, Table II can only give a general indication of the effectiveness of guarantees to mitigate FX exposure.

Tariff indexation is rated as being “effective” by the highest proportion of respondents having projects in the developed countries, and as equally “effective” or “very effective” in the developing country case. In neither case, however, is tariff indexation found to be of much use (hence being “not effective at all” or merely “fairly” so), by a significant proportion of respondents.

In contrast to local currency loans, tariff indexation instruments are highly influenced by the political risk evident in some countries. As a consequence, respondents, as a whole, are more inclined in survey 1 to rate the usefulness of local currency loans as “extremely effective” in both developing and developed countries. This preference is illustrated in Table II, regarding which it should be noted no respondents rate local guarantee loans as being either “not effective at all” or only “fairly effective.”

Table II further demonstrates that portfolio diversification is rated as either “fairly effective” or “effective” by the largest proportion of responding participants having projects in both developed and developing countries. However, the perception of usefulness is relatively low, it can be observed, virtually “across the board”. This low

perception of usefulness could well be a result of respondents having previously achieving negative correlation between currencies, since FX exposure is only reduced by the fact that not all asset classes move up or down in value at the same time, or at the same rate even when they do. However, the opportunity to diversify FX risk by owning a basket of assets denominated in different currencies is very limited in project finance – there are few multinationals active in PPP projects large enough, and that have a broad enough range of investment opportunities, to diversify their portfolio (Matsukawa *et al.*, 2003).

3.6 Knowledge of hedging instruments

As shown in the earlier sections of the paper, FX risk mitigation depends upon knowledge that appears to be limited in the construction industry case. Illustratively, however, survey 3 observes the current level of knowledge regarding hedging techniques prevalent in SMEs. In this case, whilst the majority of respondents is found to have knowledge about the most commonly used hedging tools such as forwards and swaps, something like 40 per cent have no knowledge of OTC options, futures, or exchange traded options. This is consistent with the studies by Mallin *et al.* (2001) and Bodnar *et al.* (1996), both of which identified the lack of knowledge about derivatives as the third most important factor concerning derivative users. Figure 13 shows the present research findings (which again can obviously sum to more than 100 per cent, since respondents might have knowledge of more than one relevant instrument).

Interestingly, survey 3 also tested the level of dependence (“usefulness”) that its survey respondents placed on bank advice. Besides the reliance placed on such knowledge in the context of hedging strategies, SMEs appear additionally quite dependent on bank advice as regards their FX exposure, as shown in Figure 14.

The main bank services for ameliorating FX exposure utilised in survey 3 are shown in Figure 15, which indicates the extent of the use of the available “products” in the FX domain, with the presented responses suggesting respondents’ multiple use of the facilities on offer.

Furthermore, the histogram shows a preference for banks to provide various types of advice rather than actually handle and manage the whole hedging process/transaction.

4. Implications of the research

In summary, the following main findings have been established:

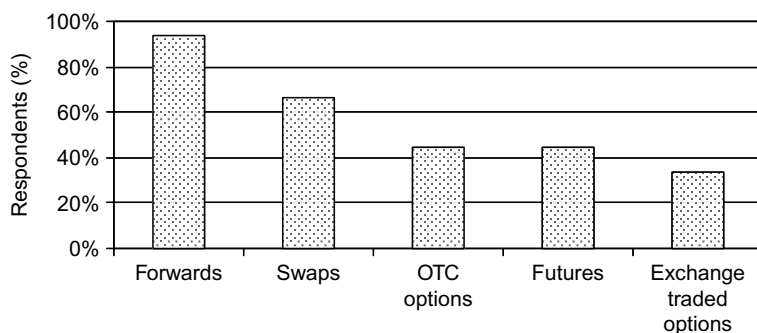


Figure 13.
Knowledge of available
hedging instruments
(survey 3)

Figure 14.
The level of dependency
on bank advice (survey 3)

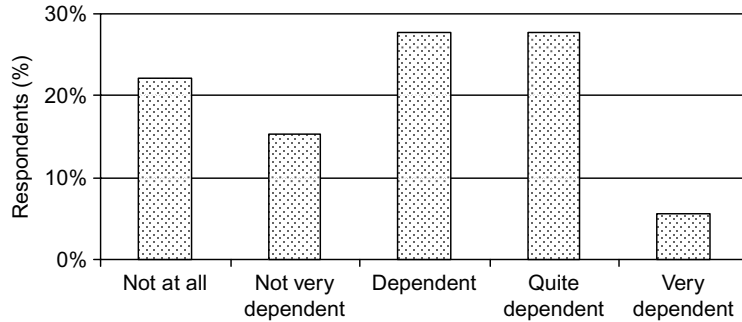
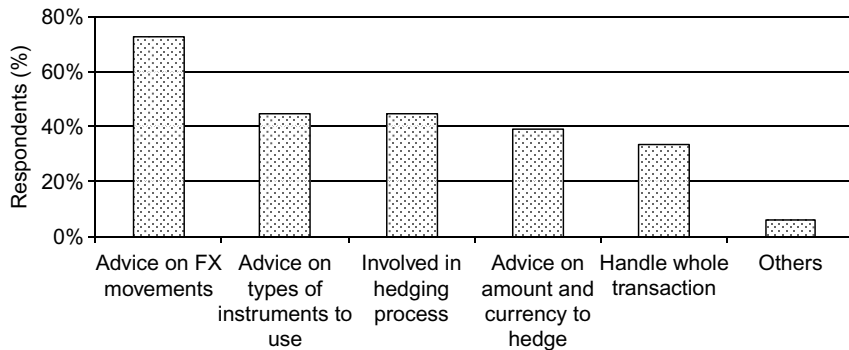


Figure 15.
Expectation of the type
of bank advice received
(survey 3)



- Survey 1:
 - (i) Economic FX exposure in the long term in concession (PPP) projects is seen as more critical in the developing countries, with a different perception emerging of effectiveness in risk mitigation instruments compared to the developed economies.
 - (ii) Even if the impact of FX exposure seems to be very or extremely critical to project success, FX exposure is often not mitigated because the exposure is estimated to be small. If FX exposure is mitigated, swaps play a major role in the developing countries.
 - (iii) Whilst different risk mitigation techniques are available, they are not considered appropriate or not perceived as being suitable hedging instruments in developing countries.
- Survey 2:
 - (i) A general level of satisfaction with available FX mitigation instruments exists in internationally operating construction companies, although very often the amount of FX exposure is too small to consider applying risk mitigation instruments.
 - (ii) The result shows that only 5 per cent of respondents ignore FX risk and 95 per cent apply different techniques to mitigate their FX exposure.

- Survey 3:
 - (i) Whilst most SMEs manage their FX exposure, they largely depend on bank advice.
 - (ii) The instruments applied differ from the techniques which are used both in PPP projects and international construction projects.
 - (iii) Forward contracts are the most common tool applied to mitigate FX exposure.

5. Summary

The present analysis of three questionnaire surveys has suggested that those engaged in PPP projects, construction companies, and SMEs having a Singaporean base, can all variously exhibit a degree of FX exposure, although for different reasons. However, the research presented also demonstrates that FX exposure is not as very well managed, both in the construction industry and elsewhere, as it might be. Because of the sophisticated process(es) involved in mitigating FX exposure in practice, such as SMEs remain largely dependent on bank advice as regards their hedging strategies. However, the potential benefits of relevant FX strategies in ensuring certainty of cash flows and the consequent guarantee of liquidity, can be significant. All three surveys demonstrate the significance of FX exposure to commercial success. So whilst the surveys' findings illustrate that swaps and forward agreements are the most commonly used hedging techniques in PPP projects, in the construction industry more generally less complicated instruments such as currency matching, borrowing in local currencies and forward market hedges, are applied. SMEs, whilst apparently using the full range of available derivatives, nevertheless appear to focus on forward and swap agreements.

Note

1. It should be noted that regulatory restrictions refer to the common control mechanisms of regulating inflow and outflow by restricting the amount of currency exchange and restricting the use of foreign currency within the country.

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Glossary

- *Basis risk*. This risk arises because of an imperfect hedging between the values of the spot and futures prices of currencies. Basis risk can also occur because of a timing mismatch, in that the maturity of the asset being hedged may not coincide with the maturity of the futures contract transacted.
- *Caps*. Caps are derivatives where the buyer receives payment at the end of each period in which the FX rate exceeds the agreed strike price.
- *Collars*. Collars represent a combination of call and put options with the aim of "locking in" a minimum and maximum exchange rate, which can be used to transact in the underlying currency at expiry.
- *Currency options*. A currency option may be defined as a contract between two parties – buyer and a seller – whereby the buyer has the right, but not the obligation, to buy or sell a specified currency at a specified exchange rate, at or before a specified date, from the seller. The seller only has an obligation in the event the right is exercised by the buyer; and the only reward received is the premium for selling the option.
- *Forwards*. A currency forward contract is a customized product where a firm agrees to sell, or buy, foreign currency at a pre-specified rate at the time of the transaction. The money is not exchanged until some agreed upon future date. Forward contracts are over-the-counter traded, with all contract terms being individually arranged and tailor-made to the circumstances.
- *Futures*. These are an exchange-traded obligation and thus similar to forwards. However, settlement takes place through a clearing house.
- *Exchange rate guarantees*. Exchange rate guarantees are mostly provided by governments and can protect lenders, sponsors, offtakers and consumers from cost increases caused by currency devaluation. They are often provided by governments in order to encourage the enhancement of infrastructure in case it is not possible to hedge FX risk in the situation of local capital market or long-term local currency financing not being available. The guarantee can mitigate the risk of government interventions to restrict currency convertibility and transfer. Government guarantees can also be written on the principal repayment of foreign currency loans.
- *Leads and Lags*. This term refers to alteration of the payments or receipts involved in a FX transaction by accelerating (leads) or slowing (lags) the transaction.
- *Local currency loans*. Through the possibility of funding the project in local currency, the FX risk exposure is indirectly mitigated. Multilateral institutions have now started to follow a new approach and provide guarantees of project debt denominated in local currency.

- *Money market hedge.* This represents an internal hedging technique involving borrowing and lending transactions in foreign currencies. The aim is to “lock in” the home currency value of a foreign currency transaction.
- *Natural hedge.* A natural hedge reduces exchange risk in the project by matching its cash flows (i.e. revenues) against expenses.
- *Options.* A currency option may be defined as a contract between two parties – a buyer and a seller – whereby the buyer of the option has the right, but not the obligation, to buy or sell a specified currency at a specified exchange rate, at or before a specified date, from the seller of the option. The contract arrangement is asymmetric because one party has the right to complete the transaction within a certain time period or to deny the contract completion if it is not profitable, while the option seller has no choice in the matter. Options are ideal hedging tools when the amount and timing of the exposure is uncertain. Options are in general divided into “call options” and “put options.” Call options give the buyer the right to buy a specified currency at a specified exchange rate, at or before a specified date; put options give the buyer the right to sell a specified currency at a specified exchange rate, at or before a specified date. Five factors contribute to the valuation of a currency option:
 - (i) the spot exchange rate;
 - (ii) the market level of option volatility;
 - (iii) the foreign interest rate;
 - (vi) the domestic interest rate; and
 - (v) the time to expiration.
- *Portfolio diversification.* Diversification is achieved by buying and holding assets with different characteristics and negative correlation. It thereby allows reducing currency risk by reducing volatility in the portfolio.
- *Swaps.* Swaps are a temporary exchange of money between two parties, who exchange principal amounts for a defined duration and agree to reverse the transaction at a later date. It can be structured as a series of forward contracts lined up on a schedule and available for longer maturities (Claessens, 1993). Usually, currency swaps are over-the-counter traded and involve counterparty default risk.
- *Tariff indexation.* FX risk can be partially mitigated by tariff indexation within the payment mechanisms. Payment mechanisms vary from user payment structures with transferred demand risk to availability payments based on the performance of the operator. Both structures can include tariffs which are adjusted on a periodic basis within the confines of a pre-agreed mechanism. Tariff indexation becomes commercially and politically unsustainable as soon as exchange rates are subject to excessively high volatility, and in such cases, tariffs could increase to a very high level and therefore make the infrastructure unaffordable for customers.

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