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due to full dollarization*



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The effect of risk aversion in the evaluation of the default risk reduction due to full dollarization: comments on “The Pros and Cons of Full Dollarization” by Andrew Berg and Eduardo Borensztein

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1. Introduction

In a recent IMF Working Paper A. Berg and E. Borensztein (2000) assess the costs and benefits of full dollarization compared to its closest alternative: a currency board. They use Argentine data on currency and default risk spreads in the Eurobond market to illustrate the reduction in dollar interest rates that could come about due to the elimination of currency risk through full dollarization, i.e. the redemption of all peso notes in circulation through the use of the Central Bank reserves that back them. Using assumptions on the probability of default in the event of a currency crisis (that range from 10% to 30%) and the size of the devaluation in case of a currency crisis (that range from 20% to 50%) they show that the default spread could diminish in the range of 72-271 basis points, according to the particular combination of assumptions¹. In particular, the higher the probability of default in the event of a currency crisis and the lower the size of the devaluation, the higher is the reduction in the dollar spread (e.g.: with a 30% probability of default in the event of a currency crisis and a 20% devaluation in the event of a currency crisis, there would be a 271 basis points reduction in the sovereign spread).

A critical ingredient in the methodology used is to infer the value of the probability of default $p(d)$ and the probability of a currency crisis $p(cc)$ using arbitrage equations as well as bond data. In the case of $p(d)$ for example, the expected return on dollar denominated Argentine bonds should equal the expected return on Treasuries of similar duration. However, this arbitrage equation implicitly assumes risk neutrality by investors. There is considerable evidence that in general investors in bond markets are risk averse. When risk aversion is assumed, the arbitrage equation needs modification to include a risk premium. This can have a significant effect on the assessment of the spread reduction.

The purpose of this note is to modify Berg and Borensztein's framework in order to quantify the reduction in default risk spreads that could be achieved in case of full dollarization under the assumption that investors are risk averse. Information on high yield spreads in the U.S. are used to obtain an approximation of the risk premium. The note does not analyze whether full dollarization is convenient for Argentina in the short-run or in the long-run nor does it intend to imply that it is. The reduction in interest rates that could be achieved through full dollarization is one among a host of costs and benefits of forfeiting the use of a national currency and this note only addresses the interest rate issue.

2. The theoretical framework

2.1 Risk neutrality

Assuming risk neutrality by investors, then due to arbitrage the expected return on an Argentine dollar bond should equal the return on a US risk-less bond of similar duration:

¹ Other assumptions that impinge on the results are that the recovery ratio in case of default is 25%, and that probabilities are assumed to remain constant over time (annual default risk probabilities are inferred using multi-annual bonds).

$$(1) \quad (1 - p(d))(1+i_A) + p(d)(1+i_A)\alpha = 1 + i_{US}$$

where $p(d)$ is the probability of default, α is the recovery factor in case of default, $1+i_A$ is the return factor on Argentine dollar bonds and $1+i_{US}$ is the return factor on US Treasury bonds. (1) implies the following expression for the default risk spread:

$$(2) \quad (i_A - i_{US}) = (1 + i_{US})\{1/[1 - p(d)(1-\alpha)] - 1\}$$

Hence, given an assumption on the recovery factor α , and given the risk spread and the yield of a representative Argentine sovereign bond, we can immediately obtain the implied probability of default $p(d)$:

$$(3) \quad p(d) = [1/(1-\alpha)][(i_A - i_{US})/(1+i_A)].$$

Analogously, by arbitrage the expected return on an Argentine government peso bond should equal the return on an Argentine government dollar bond:

$$(4) \quad (1 - p(cc))(1+i_P) + p(cc)(1+i_P)[1/(1+\delta)] = 1 + i_A$$

where $1+i_P$ is the return factor on Argentine government peso bonds and δ is the rate of devaluation in case of currency crisis (therefore $1/(1+\delta)$ is the “recovery” factor for peso investments in the event of a currency crisis). From this expression we can obtain the implied probability of a currency crisis $p(cc)$:

$$(5) \quad p(cc) = [1/(1 - 1/(1+\delta))][(i_P - i_A)/(1 + i_P)]$$

Thus, given the devaluation rate in case of a currency crisis δ , the peso-dollar spread and the yield of a representative peso-denominated bond, we can obtain the implied probability of a currency crisis.

Furthermore, the probability of default can be decomposed as:

$$(6) \quad p(d) = p(d/cc)p(cc) + p(d/ncc)(1-p(cc))$$

where $p(d/cc)$ is the probability of default given that there is a currency crisis and $p(d/ncc)$ is the probability of default given that there is no currency crisis. Rearranging this equation, we have an inverse relation between $p(d/ncc)$ and $p(d/cc)$:

$$(7) \quad p(d/ncc) = [p(d) - p(d/cc)p(cc)]/[1 - p(cc)].$$

Now, notice that in the event of dollarization, the probability of default $p(d)$ drops to $p(d/ncc)$ since, by assumption, there can no longer be a currency crisis that affects the two currencies. Therefore, the reduction in the default spread due to dollarization (as given by (2)) is:

$$(8) \quad (1 + i_{US})\{1/[1 - p(d)(1-\alpha)] - 1/[1 - p(d/ncc)(1-\alpha)]\} \\ = (1 + i_A) - (1 + i_{US})/[1 - p(d/ncc)(1-\alpha)].$$

Given assumptions on α , δ , $p(cc)$ and data on the default and currency yields and spreads, we have all that is needed to calculate (3), (5) and (7), and therefore, (8).

2.2 Risk aversion

Since investors generally are risk averse they command a risk premium over the return on a risk-less bond. Therefore, (1) must be modified to:

$$(9) \quad (1 - p(d))(1+i_A) + p(d)(1+i_A)\alpha = 1 + i_{US} + \rho_d$$

where ρ_d is the market default risk premium. This premium is related to the risk-return preferences of all market participants and to the hedging characteristics of foreign bonds such as the covariance between their rates of return and the growth of consumption or the covariance between their rates of return and the inflation rates in the countries of residence of the holders². Furthermore, this premium can be highly variable under certain circumstances. The increase in risk aversion immediately after the Russian crisis (August 1998) has been widely recognized. Anderson and Renault (1999), for example stress the idea that the “market’s risk tolerance is subject to change. When it does this can set off movements in apparently unrelated markets.” The consequent reshuffling of international portfolios can imply temporary but strong correlations in prices that create havoc in usual portfolio management techniques based in portfolio models.

We will not delve into the causes of the existence of a risk premium but will only try to approximate the effect that the existence of a risk premium can have on the expected decline in funding costs in the event of a full dollarization departing as little as possible from the Berg and Borensztein methodology. The measured benefit from full dollarization in terms of reduced yields will be seen to be also quite variable according to the level of risk aversion.

When using (9) instead of (1), the default risk spread becomes:

$$(10) \quad (i_A - i_{US}) = (1 + i_{US})\{[1 + \rho_d/(1 + i_{US})]/[1 - p(d)(1 - \alpha)] - 1\}$$

and instead of (3), the implied probability of default is

$$(11) \quad p(d) = [1/(1 - \alpha)][(i_A - i_{US} - \rho_d)/(1 + i_A)].$$

There is typically also a risk premium for currency risk, so that instead of (4) the arbitrage equation we will use is:

$$(12) \quad (1 - p(cc))(1 + i_P) + p(d)(1 + i_P)[1/(1 + \delta)] = 1 + i_A + \rho_{cc}$$

² M. Adler and B. Dumas (1983) give a useful synthesis of the international dimension of stochastic inter-temporal CAPM models. They show that the market equilibrium expected nominal rate of return on a security is equal to the risk-less rate plus a weighted average (over all investors) of the covariances of the security’s return with the inflation rates of the countries involved plus a weighted average of the security’s return with the remaining securities in the portfolio. They call the second term the inflation premium and the third the risk premium.

where ρ_{cc} is the currency risk premium. Therefore, instead of (5) the probability of currency crisis is:

$$(13) \quad p(cc) = [1/(1 - 1/(1+\delta))][(i_p - i_A - \rho_{cc})/(1+i_p)].$$

Consequently, the reduction of the default risk spread (as given by (10)) due to dollarization is given by:

$$(14) \quad (1 + i_{US} + \rho_d) \{ 1/[1 - p(d)(1-\alpha)] - 1/[1 - p(d/ncc)(1-\alpha)] \}.$$

$$= (1 + i_A) - (1 + i_{US} + \rho_d)/[1 - p(d/ncc)(1-\alpha)].$$

3. The reduction in the default spread due to full dollarization

3.1 Risk Neutrality

Table 1 below quantifies the estimated reduction in the default spread that could come about through full dollarization using Republic-07 (peso-denominated) notes and Republic-06 (dollar-denominated) un-subordinated bonds. These bonds currently have durations of 4.4 and 4.5 years, respectively. The recovery ratio given default α is assumed to be 0.25, as in Berg and Borensztein (2000). However, using a model that permits the estimation of both default probabilities and the recovery ratio, Merrick (2000) has shown that the implicit market recovery ratio for Argentina has been around 50% both before and after the Russian moratorium.³ Consequently, we show below the effect of assuming a 50% recovery ratio.

As Table 1 below shows, the spread over U.S. Treasuries for the Republic-06 bond averaged 472 basis points over the period Jan-97/10-May-00, but varied widely during certain sub-periods. During the first 9 months of 1997, that is before the contagion from the speculative attack on the Hong Kong dollar, the spread averaged 298 basis points. Thereafter, the spread averaged around 370 basis points, rising to an average of 714 basis points during the last 5 months of 1998, after the Russian moratorium, to decrease thereafter to an average of 540 basis points during 1999 and the first four months of 2000. A similar evolution is observed for the currency spread between Republic-07 and Republic-06 yields, although the levels of these spreads are clearly lower.

Table 1

Basis Points	i_A	i_p	i_{US}	$i_A - i_{US}$	$i_p - i_A$	ρ_D
Jan-97/May-00	1064	1379	592	472	315	77
Jan-97/Sep-97	936	1040	639	298	105	77
Oct-97/Dec-97	986	1256	597	378	270	77
Jan-98/Jul-98	939	1181	571	367	242	77
Aug-98/Dec 98	1219	1758	503	714	539	77
Jan 99-May-00	1143	1528	603	540	385	78

³ In the case of Russia, however, the implicit recovery rate diminished very substantially after the moratorium. Cf. Merrick (2000).

Table 2 shows that the implicit probability of default given that there is no currency crisis ($p(d/ncc)$) averaged between 0.8% and 4.7% for the period Jan-97/May-00, according to the assumptions on $p(d/cc)$ and δ^4 . The probability of default given no currency crisis is clearly higher the lower is the probability of default given a currency crisis and the higher is the devaluation in case of a currency crisis.

Table 2

P(d/ncc)				
	P(d/cc)			
δ	20%	40%	60%	80%
20%	2.8%			
40%	4.2%	2.0%		
60%	4.5%	3.0%	1.4%	
80%	4.7%	3.4%	2.1%	0.8%

Table 3 shows that the reduction in the default spread due to full dollarization ranges between 82 and 412 basis points, according to the same assumptions. The reduction is higher the greater is the probability of default given a currency crisis ($p(d/cc)$) and the smaller is the percentage devaluation (δ). Comparing Tables 2 and 3, it is clear that the reduction is higher the smaller is $p(d/ncc)$. This is obvious from (8) as $p(d)$ is given by the data and the assumption on α . Also, as can be seen in the Tables in the Appendix, in general the reduction is higher during the periods of greater default spreads, as after the Russian crisis.

Table 3

Reduction in default spread				
	P(d/cc)			
δ	20%	40%	60%	80%
20%	242			
40%	131	310		
60%	98	232	363	
80%	82	194	304	412

Berg and Borensztein (2000), using Eurobonds obtain a reduction of 186 basis points under $p(d/cc)=20\%$ and $\delta=20\%$ and 116 basis points under $p(d/cc)=20\%$ and $\delta=40\%$ for the period 1997-1998. Our results for the same period (not shown in the Tables) and using Republics are not too different: reductions of 198 and 105 basis points, respectively. Also, Andrew Powell (2000), using the EMBI+ spread as measure of default risk and 1 year NDF as a measure of currency risk, obtained a 500 basis points reduction in default risk spread for the period Jun97-Feb-99, under the assumptions $p(d/cc)=30\%$ and $\delta=30\%$. In comparison, our results under the same assumptions (not shown in table) are quite lower: a 285 basis points reduction.

⁴ We have left blanks wherever the probability of default given a currency crisis was negative.

3.2 Risk Aversion

To obtain a rough estimate of the default risk premium we use data from Merrill Lynch's Master II High Yield bond index as well as information from Carty and Lieberman (1996) on average default rates and average recovery rates in the event of default for U.S. corporations rated Ba by Moody's (or, equivalently, BB by Standard & Poor's).

Although the Master II index is a composite index of BB, B and C bonds, we only use the BB component as Argentine sovereign foreign currency denominated long-term bonds are rated BB by Standard & Poor's and Fitch-IBCA. The Master II index includes only U.S. dollar denominated bonds that are rated below investment grade but are not in default, have a fixed coupon schedule, are at least \$100 million face value outstanding and were issued in the U.S. Domestic or Yankee markets. As of mid-December 1999, the BB component had a modified duration of 5.3 years and a yield to maturity of 9.264% while the comparable U.S. Treasury Master had the same modified duration and a yield to maturity of 6.434%. Consequently, the default risk (and probably also liquidity risk) spread of the BB component was 283 basis points.

According to Carty and Lieberman (1996), Ba/BB rated U.S. corporate bonds over the period from 1970 to 1996 have had an average default rate of 1.36% and the recovery rate for senior unsecured bonds has been 47.5%⁵. Therefore, an estimate of the expected yield as of mid-December 1999 of the Ba/BB rated U.S. corporate bonds is 8.424% ($=98.64\% \cdot 1.09264 + 1.36\% \cdot 0.475 - 1$). The actual yield of 9.264% thus commands a default risk (and possibly liquidity risk) premium of 78 basis points. This same calculation was performed for the daily data, giving an average of 77 basis points for the default premium over the period as a whole, as reported in the last column of Table 1. For sub-periods, the default risk premium was surprisingly constant.

This risk premium was used to recalculate the reduction in the default spread due to full dollarization according to (14). Not having a comparable way of estimating a risk premium for currency risk we used, first, the same premium as for default risk and, second, half that premium. As can be seen in Table 4, in the first case, the probability of default given that there is a currency crisis ranged from 0.4 to 3.4% for the period as a whole. Table 5 shows that the reduction in the default spread ranged between 64 and 369 basis points, according to the assumptions.

Table 4

P(d/ncc)				
	P(d/cc)			
δ	20%	40%	60%	80%
20%	2.6%			
40%	3.6%	2.0%	0.4%	
60%	3.9%	2.7%	1.5%	0.3%
80%	4.0%	3.0%	2.0%	1.0%

⁵ During the shorter but more recent period 1981-1994, Standard & Poor's BB rated bonds have had an average default rate of 1.17%, somewhat less than Moody's but not too different. Cfr. Standard & Poor's (1994).

Table 5

Reduction in default spread				
	P(d/cc)			
δ	20%	40%	60%	80%
20%	185			
40%	102	234	362	
60%	77	176	273	369
80%	64	147	229	310

Table 6

%Decrease in the reduction in default spread due to risk aversion				
	P(d/cc)			
δ	20%	40%	60%	80%
20%	-24%			
40%	-22%	-25%		
60%	-22%	-24%	-25%	
80%	-21%	-24%	-25%	-25%

In general, the reductions in the default spread are substantially smaller than under risk neutrality. For the period as a whole, the decrease in the default spread reduction is in the range of 18 to 102 basis points or 21% to 25% less than the risk neutrality spread reduction. The effect of risk aversion in diminishing the reduction in spread due to full dollarization is higher, the higher is $p(d/cc)$ and the lower is δ .

Considering sub-periods, however, the effects of risk aversion are more complex. As can be seen in the Appendix tables, the effect of risk aversion is highest in the most tranquil period, that is before the Asian crisis. There the assumption of risk aversion diminishes the default spread reduction in the 73%-74% range. At the other extreme, the effect of risk aversion is smallest in the most turbulent periods. For example, during the worst of the Russian crisis, the percentage reduction in the spread reduction due to risk aversion is in the 10%-15% range.

When the devaluation risk premium is equal to one half of the default risk premium, full dollarization produces a slightly greater reduction in the default spread than when the two premiums are equal. The percentage reductions are in the range 16%-77% (instead of 14%-65%). However, the effect of risk aversion is quite sensitive to the assumption on the devaluation risk premium. When the devaluation risk premium is only one half of the default risk premium the reduction (due to risk aversion) in the default risk spread fall (due to full dollarization) is in the range 8%-12,2%, according to the assumptions (instead of 21%-25%).

When, following Merrick (2000), a 50% recovery ratio is assumed (instead of 25%), the reduction in the default spread due to full dollarization is somewhat lower, both under risk neutrality and risk aversion. In the first case, the reduction is in the range 9%-57% (instead of 17%-87%) and under risk aversion the reduction is in the range 8%-43% (instead of 14%-66%). Also, the change in the assumed recovery ratio is not too important for the estimate of the effect of risk aversion. The percentage decrease

(because of risk aversion) in the reduction of the default spread (due to full dollarization) is in the range 18%-24% (instead of 21%-25%).

4. Conclusions

Risk aversion is something to be taken into account when estimating the potential benefits of full dollarization. The introduction of default and devaluation risk premiums diminishes the estimated reduction in the default spread that could be achieved by forfeiting a national currency. The effect is particularly strong in tranquil times, when default and currency risk spreads are relatively low.

5. References

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APPENDIX

TABLES AND CHARTS

Devaluation Risk premium = Default Risk Premium
Total Period: Jan'97//May'00

Reduction of Default Spread					
Risk Neutrality					
		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	241,6			
	40%	131,4	310,0		
	60%	98,0	232,0	362,7	
	80%	81,8	194,0	304,0	411,7
Risk Aversion					
		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	184,5			
	40%	102,4	233,8	362,1	
	60%	76,7	175,8	273,1	368,6
	80%	64,2	147,3	229,2	309,9
Decrease in the reduction of Default Spread due to					
Basis Points					
		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	-57,0			
	40%	-29,1	-76,2		
	60%	-21,2	-56,2	-89,7	
	80%	-17,5	-46,6	-74,7	-101,8
Percentage					
		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	-23,6%			
	40%	-22,1%	-24,6%		
	60%	-21,7%	-24,2%	-24,7%	
	80%	-21,4%	-24,0%	-24,6%	-24,7%

Final Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	230,5			
	40%	472	340,6	162,0		
	60%	472	374,1	240,1	109,3	
	80%	472	390,3	278,0	168,1	60,3
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	287,5			
	40%	472	369,7	238,2	109,9	
	60%	472	395,3	296,2	198,9	103,4
	80%	472	407,8	324,7	242,8	162,1
Percentage Reduction in Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-51,2%			
	40%	472	-27,8%	-65,7%		
	60%	472	-20,8%	-49,1%	-76,8%	
	80%	472	-17,3%	-41,1%	-64,4%	-87,2%
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-39,1%			
	40%	472	-21,7%	-49,5%	-76,7%	
	60%	472	-16,3%	-37,2%	-57,9%	-78,1%
	80%	472	-13,6%	-31,2%	-48,6%	-65,7%

Devaluation Risk Premium = 1/2 Default Risk Premium
Total Period: Jan'97//May'00

Reduction of Default Spread					
Risk Neutrality					
		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	241,6			
	40%	131,4	310,0		
	60%	98,0	232,0	362,7	
	80%	81,8	194,0	304,0	411,7
Risk Aversion					
		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	219,1			
	40%	120,4	274,5		
	60%	90,0	205,9	319,4	
	80%	75,2	172,4	267,9	361,7
Decrease in the reduction of Default Spread due to					
Basis Points					
		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	-22,5			
	40%	-11,0	-35,5		
	60%	-7,9	-26,1	-43,4	
	80%	-6,5	-21,6	-36,1	-50,1
Percentage					
		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	-9,3%			
	40%	-8,4%	-11,5%		
	60%	-8,1%	-11,2%	-12,0%	
	80%	-8,0%	-11,1%	-11,9%	-12,2%

Final Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	230,5			
	40%	472	340,6	162,0		
	60%	472	374,1	240,1	109,3	
	80%	472	390,3	278,0	168,1	60,3
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	252,9			
	40%	472	351,6	197,5		
	60%	472	382,0	266,1	152,6	
	80%	472	396,8	299,6	204,1	110,3
Percentage Reduction in Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-51,2%			
	40%	472	-27,8%	-65,7%		
	60%	472	-20,8%	-49,1%	-76,8%	
	80%	472	-17,3%	-41,1%	-64,4%	-87,2%
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-46,4%			
	40%	472	-25,5%	-58,2%		
	60%	472	-19,1%	-43,6%	-67,7%	
	80%	472	-15,9%	-36,5%	-56,7%	-76,6%

Devaluation Risk premium = Default Risk Premium
Pre-Asian Crisis: Jan-Sep97

Reduction of Default Spread					
Risk Neutrality					
		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	82,6	181,8	279,2	
	40%	47,1	104,2	160,6	216,5
	60%	35,7	78,9	121,8	164,4
	80%	30,0	66,4	102,6	138,5
Risk Aversion					
		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	21,8	46,8	71,8	96,6
	40%	12,6	27,2	41,7	56,2
	60%	9,6	20,7	31,8	42,8
	80%	8,1	17,5	26,8	36,1
Decrease in the reduction of Default Spread due to					
Basis Points					
		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	-60,8	-134,9	-207,4	
	40%	-34,5	-77,0	-118,9	-160,3
	60%	-26,0	-58,2	-90,1	-121,6
	80%	-21,9	-48,9	-75,8	-102,4
Percentage					
		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	-73,6%	-74,2%	-74,3%	
	40%	-73,2%	-73,9%	-74,0%	-74,0%
	60%	-73,0%	-73,8%	-73,9%	-74,0%
	80%	-73,0%	-73,7%	-73,9%	-73,9%

Final Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	298	215,5	215,5	18,8	
	40%	298	250,9	193,8	137,4	81,5
	60%	298	262,4	219,1	176,2	133,6
	80%	298	268,0	231,6	195,5	159,5
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	298	276,2	251,2	226,2	201,4
	40%	298	285,4	270,8	256,3	241,8
	60%	298	288,4	277,3	266,3	255,2
	80%	298	289,9	280,6	271,2	261,9
Percentage Reduction in Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-27,7%	-27,7%	-93,7%	
	40%	472	-15,8%	-35,0%	-53,9%	-72,6%
	60%	472	-12,0%	-26,5%	-40,9%	-55,2%
	80%	472	-10,1%	-22,3%	-34,4%	-46,5%
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-7,3%	-15,7%	-24,1%	-32,4%
	40%	472	-4,2%	-9,1%	-14,0%	-18,9%
	60%	472	-3,2%	-6,9%	-10,7%	-14,4%
	80%	472	-2,7%	-5,9%	-9,0%	-12,1%

Devaluation Risk Premium = 1/2 Default Risk Premium
Pre-Asian Crisis: Jan-Sep97

Reduction of Default Spread					
Risk Neutrality					
		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	82,6	181,8	279,2	
	40%	47,1	104,2	160,6	216,5
	60%	35,7	78,9	121,8	164,4
	80%	30,0	66,4	102,6	138,5
Risk Aversion					
		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	53,6	114,9	175,5	
	40%	30,9	66,3	101,5	136,5
	60%	23,4	50,3	77,1	103,8
	80%	19,7	42,4	65,0	87,5
Decrease in the reduction of Default Spread due to					
Basis Points					
		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	-28,9	-66,9	-103,7	
	40%	-16,3	-37,9	-59,1	-80,0
	60%	-12,2	-28,6	-44,7	-60,6
	80%	-10,3	-24,0	-37,6	-51,0
Percentage					
		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	-35,1%	-36,8%	-37,1%	
	40%	-34,5%	-36,4%	-36,8%	-37,0%
	60%	-34,4%	-36,2%	-36,7%	-36,9%
	80%	-34,3%	-36,2%	-36,6%	-36,8%

Final Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	298	215,5	116,3	18,8	
	40%	298	250,9	193,8	137,4	81,5
	60%	298	262,4	219,1	176,2	133,6
	80%	298	268,0	231,6	195,5	159,5
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	298	244,4	183,1	122,5	
	40%	298	267,2	231,7	196,5	161,5
	60%	298	274,6	247,7	220,9	194,2
	80%	298	278,3	255,6	233,0	210,5
Percentage Reduction in Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-27,7%	-61,0%	-93,7%	
	40%	472	-15,8%	-35,0%	-53,9%	-72,6%
	60%	472	-12,0%	-26,5%	-40,9%	-55,2%
	80%	472	-10,1%	-22,3%	-34,4%	-46,5%
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-18,0%	-38,6%	-58,9%	
	40%	472	-10,4%	-22,2%	-34,1%	-45,8%
	60%	472	-7,9%	-16,9%	-25,9%	-34,8%
	80%	472	-6,6%	-14,2%	-21,8%	-29,4%

Devaluation Risk premium = Default Risk Premium
Asian Crisis: Oct-Dec97

Reduction of Default Spread						
Risk Neutrality						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	215,0				
	40%	118,3	269,0			
	60%	88,4	201,8	312,9		
	80%	73,9	169,0	262,5	354,3	
Risk Aversion						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	155,2				
	40%	87,0	192,2	295,4		
	60%	65,4	144,9	223,2	300,4	
	80%	54,8	121,6	187,5	252,7	
Decrease in the reduction of Default Spread due to						
Basis Points						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	-59,8				
	40%	-31,3	-76,8			
	60%	-23,0	-57,0	-89,7		
	80%	-19,1	-47,4	-74,9	-101,6	
Percentage						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	-27,8%				
	40%	-26,5%	-28,6%			
	60%	-26,0%	-28,2%	-28,7%		
	80%	-25,8%	-28,1%	-28,5%	-28,7%	

Final Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	387	171,8			
	40%	387	268,5	117,8		
	60%	387	298,4	185,0	73,9	
	80%	387	312,9	217,8	124,3	32,5
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	387	231,6			
	40%	387	299,8	194,6	91,4	
	60%	387	321,4	241,9	163,6	86,4
	80%	387	332,0	265,2	199,2	134,1
Percentage Reduction in Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-55,6%			
	40%	472	-30,6%	-69,5%		
	60%	472	-22,9%	-52,2%	-80,9%	
	80%	472	-19,1%	-43,7%	-67,9%	-91,6%
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-40,1%			
	40%	472	-22,5%	-49,7%	-76,4%	
	60%	472	-16,9%	-37,5%	-57,7%	-77,7%
	80%	472	-14,2%	-31,4%	-48,5%	-65,3%

Devaluation Risk Premium = 1/2 Default Risk Premium
Asian Crisis: Oct-Dec97

Reduction of Default Spread						
Risk Neutrality						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	215,0				
	40%	118,3	269,0			
	60%	88,4	201,8	312,9		
	80%	73,9	169,0	262,5	354,3	
Risk Aversion						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	190,0				
	40%	105,5	232,7			
	60%	79,1	175,0	269,3		
	80%	66,2	146,7	226,1	304,2	
Decrease in the reduction of Default Spread due to						
Basis Points						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	-25,0				
	40%	-12,7	-36,3			
	60%	-9,3	-26,8	-43,7		
	80%	-7,7	-22,3	-36,4	-50,1	
Percentage						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	-11,6%				
	40%	-10,8%	-13,5%			
	60%	-10,5%	-13,3%	-14,0%		
	80%	-10,4%	-13,2%	-13,9%	-14,1%	

Final Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	387	171,8			
	40%	387	268,5	117,8		
	60%	387	298,4	185,0	73,9	
	80%	387	312,9	217,8	124,3	32,5
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	387	196,8			
	40%	387	281,3	154,1		
	60%	387	307,7	211,8	117,5	
	80%	387	320,5	240,0	160,7	82,6
Percentage Reduction in Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-55,6%			
	40%	472	-30,6%	-69,5%		
	60%	472	-22,9%	-52,2%	-80,9%	
	80%	472	-19,1%	-43,7%	-67,9%	-91,6%
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-49,1%			
	40%	472	-27,3%	-60,2%		
	60%	472	-20,5%	-45,3%	-69,6%	
	80%	472	-17,1%	-37,9%	-58,4%	-78,7%

Devaluation Risk premium = Default Risk Premium
Pre-Russian Crisis: Jan-Jul98

Reduction of Default Spread						
Risk Neutrality						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	193,6				
	40%	107,2	242,2			
	60%	80,3	182,0	281,9		
	80%	67,2	152,5	236,6	319,3	
Risk Aversion						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	133,6	291,6			
	40%	75,3	165,4	254,0		
	60%	56,7	124,9	192,2	258,6	
	80%	47,6	104,9	161,6	217,7	
Decrease in the reduction of Default Spread due to						
Basis Points						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	-60,0				
	40%	-31,9	-76,8			
	60%	-23,6	-57,2	-89,7		
	80%	-19,6	-47,7	-75,0	-101,6	
Percentage						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	-31,0%				
	40%	-29,7%	-31,7%			
	60%	-29,3%	-31,4%	-31,8%		
	80%	-29,2%	-31,2%	-31,7%	-31,8%	

Final Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	367	173,8			
	40%	367	260,2	125,2		
	60%	367	287,1	185,4	85,5	
	80%	367	300,2	214,9	130,8	48,1
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	367	233,8	75,8		
	40%	367	292,1	202,0	113,4	
	60%	367	310,7	242,5	175,3	108,8
	80%	367	319,8	262,5	205,9	149,8
Percentage Reduction in Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-52,7%			
	40%	472	-29,2%	-65,9%		
	60%	472	-21,9%	-49,5%	-76,7%	
	80%	472	-18,3%	-41,5%	-64,4%	-86,9%
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-36,4%	-79,4%		
	40%	472	-20,5%	-45,0%	-69,1%	
	60%	472	-15,4%	-34,0%	-52,3%	-70,4%
	80%	472	-13,0%	-28,5%	-44,0%	-59,2%

Devaluation Risk Premium = 1/2 Default Risk Premium
Pre-Russian Crisis: Jan-Jul98

Reduction of Default Spread						
Risk Neutrality						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	193,6				
	40%	107,2	242,2			
	60%	80,3	182,0	281,9		
	80%	67,2	152,5	236,6	319,3	
Risk Aversion						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	167,9				
	40%	93,8	205,7			
	60%	70,5	154,9	238,1		
	80%	59,1	130,0	200,0	269,1	
Decrease in the reduction of Default Spread due to						
Basis Points						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	-25,7				
	40%	-13,4	-36,5			
	60%	-9,8	-27,1	-43,8		
	80%	-8,1	-22,5	-36,6	-50,2	
Percentage						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	-13,3%				
	40%	-12,5%	-15,1%			
	60%	-12,2%	-14,9%	-15,5%		
	80%	-12,1%	-14,8%	-15,5%	-15,7%	

Final Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	367	173,8			
	40%	367	260,2	125,2		
	60%	367	287,1	185,4	85,5	
	80%	367	300,2	214,9	130,8	48,1
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	367	199,5			
	40%	367	273,6	161,7		
	60%	367	296,9	212,5	129,3	
	80%	367	308,4	237,4	167,4	98,3
Percentage Reduction in Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-52,7%			
	40%	472	-29,2%	-65,9%		
	60%	472	-21,9%	-49,5%	-76,7%	
	80%	472	-18,3%	-41,5%	-64,4%	-86,9%
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-45,7%			
	40%	472	-25,5%	-56,0%		
	60%	472	-19,2%	-42,2%	-64,8%	
	80%	472	-16,1%	-35,4%	-54,4%	-73,2%

Devaluation Risk premium = Default Risk Premium
Russian Crisis: Ago-Dec98

Reduction of Default Spread						
Risk Neutrality						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	379,3				
	40%	194,3	516,3			
	60%	142,3	381,0	609,7		
	80%	117,7	316,5	508,3	693,4	
Risk Aversion						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	331,7				
	40%	173,9	442,7			
	60%	128,2	328,4	521,5		
	80%	106,4	273,5	435,6	593,0	
Decrease in the reduction of Default Spread due to						
Basis Points						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	-47,6				
	40%	-20,4	-73,6			
	60%	-14,1	-52,6	-88,2		
	80%	-11,3	-43,0	-72,7	-100,4	
Percentage						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	-12,6%				
	40%	-10,5%	-14,3%			
	60%	-9,9%	-13,8%	-14,5%		
	80%	-9,6%	-13,6%	-14,3%	-14,5%	

Final Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	714	334,7			
	40%	714	519,6	197,7		
	60%	714	571,7	333,0	104,3	
	80%	714	596,2	397,5	205,7	20,6
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	714	382,3			
	40%	714	540,0	271,3		
	60%	714	585,8	385,6	192,5	
	80%	714	607,5	440,5	278,4	121,0
Percentage Reduction in Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-53,1%			
	40%	472	-27,2%	-72,3%		
	60%	472	-19,9%	-53,4%	-85,4%	
	80%	472	-16,5%	-44,3%	-71,2%	
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-46,5%			
	40%	472	-24,4%	-62,0%		
	60%	472	-18,0%	-46,0%	-73,0%	
	80%	472	-14,9%	-38,3%	-61,0%	-83,1%

Devaluation Risk Premium = 1/2 Default Risk Premium
 Russian Crisis: Ago-Dec98

Reduction of Default Spread						
Risk Neutrality						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	379,3				
	40%	194,3	516,3			
	60%	142,3	381,0	609,7		
	80%	117,7	316,5	508,3	693,4	
Risk Aversion						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	367,8				
	40%	190,8	484,4			
	60%	140,2	358,5	568,3		
	80%	116,2	298,2	474,3	644,8	
Decrease in the reduction of Default Spread due to						
Basis Points						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	-11,5				
	40%	-3,5	-31,9			
	60%	-2,1	-22,5	-41,3		
	80%	-1,5	-18,3	-34,0	-48,6	
Percentage						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	-3,0%				
	40%	-1,8%	-6,2%			
	60%	-1,5%	-5,9%	-6,8%		
	80%	-1,3%	-5,8%	-6,7%	-7,0%	

Final Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	714	334,7			
	40%	714	519,6	197,7		
	60%	714	571,7	333,0	104,3	
	80%	714	596,2	397,5	205,7	20,6
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	714	346,2			
	40%	714	523,2	229,6		
	60%	714	573,8	355,5	145,6	
	80%	714	597,8	415,8	239,7	69,2
Percentage Reduction in Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-53,1%			
	40%	472	-27,2%	-72,3%		
	60%	472	-19,9%	-53,4%	-85,4%	
	80%	472	-16,5%	-44,3%	-71,2%	-97,1%
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-51,5%			
	40%	472	-26,7%	-67,8%		
	60%	472	-19,6%	-50,2%	-79,6%	
	80%	472	-16,3%	-41,8%	-66,4%	-90,3%

Devaluation Risk premium = Default Risk Premium
Brazilian Crisis and After: Jan99-May00

Reduction of Default Spread						
Risk Neutrality						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	290,1				
	40%	155,2	376,5			
	60%	115,0	280,6	441,3		
	80%	95,8	234,2	369,2	500,9	
Risk Aversion						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	234,8				
	40%	128,2	300,5			
	60%	95,6	225,0	351,5		
	80%	79,8	188,3	294,6	398,9	
Decrease in the reduction of Default Spread due to						
Basis Points						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	-55,3				
	40%	-27,0	-76,0			
	60%	-19,4	-55,6	-89,8		
	80%	-15,9	-45,9	-74,6	-102,0	
Percentage						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	-19,1%				
	40%	-17,4%	-20,2%			
	60%	-16,9%	-19,8%	-20,4%		
	80%	-16,6%	-19,6%	-20,2%	-20,4%	

Final Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	540	249,4			
	40%	540	384,3	163,0		
	60%	540	424,5	258,9	98,2	
	80%	540	443,7	305,3	170,3	38,6
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	540	304,7			
	40%	540	411,3	239,0		
	60%	540	443,9	314,5	188,0	
	80%	540	459,7	351,2	244,9	140,6
Percentage Reduction in Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-53,8%			
	40%	472	-28,8%	-69,8%		
	60%	472	-21,3%	-52,0%	-81,8%	
	80%	472	-17,7%	-43,4%	-68,4%	-92,8%
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-43,5%			
	40%	472	-23,8%	-55,7%		
	60%	472	-17,7%	-41,7%	-65,1%	
	80%	472	-14,8%	-34,9%	-54,6%	-73,9%

Devaluation Risk Premium = 1/2 Default Risk Premium
Brazilian Crisis and After: Jan99-May00

Reduction of Default Spread						
Risk Neutrality						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	290,1				
	40%	155,2	376,5			
	60%	115,0	280,6	441,3		
	80%	95,8	234,2	369,2	500,9	
Risk Aversion						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	270,3				
	40%	146,1	341,8			
	60%	108,7	255,4	398,2		
	80%	90,6	213,4	333,5	451,0	
Decrease in the reduction of Default Spread due to						
Basis Points						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	-19,8				
	40%	-9,0	-34,7			
	60%	-6,3	-25,2	-43,0		
	80%	-5,1	-20,8	-35,7	-49,9	
Percentage						
		P(d/cc)				
		20%	40%	60%	80%	
Devaluation Rate	20%	-6,8%				
	40%	-5,8%	-9,2%			
	60%	-5,5%	-9,0%	-9,8%		
	80%	-5,4%	-8,9%	-9,7%	-10,0%	

Final Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	540	249,4			
	40%	540	384,3	163,0		
	60%	540	424,5	258,9	98,2	
	80%	540	443,7	305,3	170,3	38,6
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	540	269,2			
	40%	540	393,4	197,7		
	60%	540	430,8	284,1	141,3	
	80%	540	448,9	326,1	206,0	88,5
Percentage Reduction in Default Spread						
Risk Neutrality						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-53,8%			
	40%	472	-28,8%	-69,8%		
	60%	472	-21,3%	-52,0%	-81,8%	
	80%	472	-17,7%	-43,4%	-68,4%	-92,8%
Risk Aversion						
		Spread	P(d/cc)			
			20%	40%	60%	80%
Devaluation Rate	20%	472	-50,1%			
	40%	472	-27,1%	-63,4%		
	60%	472	-20,1%	-47,3%	-73,8%	
	80%	472	-16,8%	-39,6%	-61,8%	-83,6%

P(d/ncc)

Risk Neutral

Devaluation Risk premium = Default Risk Premium

Total Period: Jan'97//May'00

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	2,8%			
	40%	4,2%	2,0%		
	60%	4,5%	3,0%	1,4%	
	80%	4,7%	3,4%	2,1%	0,8%

Pre-Asian Crisis: Jan-Sep97

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	2,6%	1,4%	0,2%	
	40%	3,1%	2,4%	1,7%	1,0%
	60%	3,2%	2,7%	2,2%	1,7%
	80%	3,3%	2,8%	2,4%	2,0%

Asian Crisis: Oct-Dec97

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	2,1%			
	40%	3,3%	1,5%		
	60%	3,7%	2,3%	0,9%	
	80%	3,8%	2,7%	1,5%	0,4%

Pre-Russian Crisis: Jan-Jul98

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	2,2%			
	40%	3,2%	1,6%		
	60%	3,5%	2,3%	1,1%	
	80%	3,7%	2,7%	1,6%	0,6%

Russian Crisis: Ago-Dec98

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	4,1%			
	40%	6,3%	2,5%		
	60%	6,9%	4,1%	1,3%	
	80%	7,2%	4,9%	2,6%	0,3%

Brazilian Crisis and After: Jan99-May00

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	3,1%			
	40%	4,7%	2,0%		
	60%	5,1%	3,2%	1,2%	
	80%	5,4%	3,7%	2,1%	0,5%

P(d/ncc)

Risk Aversion

Devaluation Risk premium = Default Risk Premium

Total Period: Jan'97//May'00

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	2,6%			
	40%	3,6%	2,0%	0,4%	
	60%	3,9%	2,7%	1,5%	0,3%
	80%	4,0%	3,0%	2,0%	1,0%

Pre-Asian Crisis: Jan-Sep97

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	2,4%	2,1%	1,8%	1,5%
	40%	2,5%	2,4%	2,2%	2,0%
	60%	2,6%	2,4%	2,3%	2,2%
	80%	2,6%	2,5%	2,4%	2,3%

Asian Crisis: Oct-Dec97

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	1,9%			
	40%	2,7%	1,5%	0,2%	
	60%	3,0%	2,0%	1,1%	0,1%
	80%	3,1%	2,3%	1,5%	0,7%

Pre-Russian Crisis: Jan-Jul98

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	1,9%	0,0%		
	40%	2,6%	1,5%	0,5%	
	60%	2,9%	2,0%	1,2%	0,4%
	80%	3,0%	2,3%	1,6%	0,9%

Russian Crisis: Ago-Dec98

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	3,7%			
	40%	5,6%	2,4%		
	60%	6,1%	3,8%	1,4%	
	80%	6,4%	4,4%	2,5%	0,5%

Brazilian Crisis and After: Jan99-May00

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	2,8%			
	40%	4,0%	2,0%		
	60%	4,4%	2,9%	1,4%	
	80%	4,6%	3,3%	2,1%	0,8%

P(d/ncc)
Risk Neutral
Devaluation Risk Premium = 1/2 Default Risk Premium
 Total Period: Jan'97//May'00

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	2,8%			
	40%	4,2%	2,0%		
	60%	4,5%	3,0%	1,4%	
	80%	4,7%	3,4%	2,1%	

Pre-Asian Crisis: Jan-Sep97

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	2,6%	1,4%	0,2%	
	40%	3,1%	2,4%	1,7%	1,0%
	60%	3,2%	2,7%	2,2%	1,7%
	80%	3,3%	2,8%	2,4%	2,0%

Asian Crisis: Oct-Dec97

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	2,1%			
	40%	3,3%	1,5%		
	60%	3,7%	2,3%	0,9%	
	80%	3,8%	2,7%	1,5%	0,4%

Pre-Russian Crisis: Jan-Jul98

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	2,2%			
	40%	3,2%	1,6%		
	60%	3,5%	2,3%	1,1%	
	80%	3,7%	2,7%	1,6%	0,6%

Russian Crisis: Ago-Dec98

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	4,1%			
	40%	6,3%	2,5%		
	60%	6,9%	4,1%	1,3%	
	80%	7,2%	4,9%	2,6%	0,3%

Brazilian Crisis and After: Jan99-May00

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	3,1%			
	40%	4,7%	2,0%		
	60%	5,1%	3,2%	1,2%	
	80%	5,4%	3,7%	2,1%	0,5%

P(d/ncc)
Risk Aversion
Devaluation Risk Premium = 1/2 Default Risk Premium
 Total Period: Jan'97//May'00

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	2,2%			
	40%	3,3%	1,5%		
	60%	3,7%	2,3%	0,9%	
	80%	3,9%	2,7%	1,6%	0,4%

Pre-Asian Crisis: Jan-Sep97

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	2,0%	1,3%	0,6%	
	40%	2,3%	1,9%	1,5%	1,0%
	60%	2,4%	2,1%	1,8%	1,4%
	80%	2,5%	2,2%	1,9%	1,6%

Asian Crisis: Oct-Dec97

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	1,5%			
	40%	2,5%	1,0%		
	60%	2,8%	1,7%	0,5%	
	80%	3,0%	2,0%	1,0%	0,1%

Pre-Russian Crisis: Jan-Jul98

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	1,5%			
	40%	2,4%	1,1%		
	60%	2,7%	1,7%	0,7%	
	80%	2,8%	2,0%	1,1%	0,3%

Russian Crisis: Ago-Dec98

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	3,3%			
	40%	5,4%	1,9%		
	60%	6,0%	3,4%	0,9%	
	80%	6,2%	4,1%	2,0%	

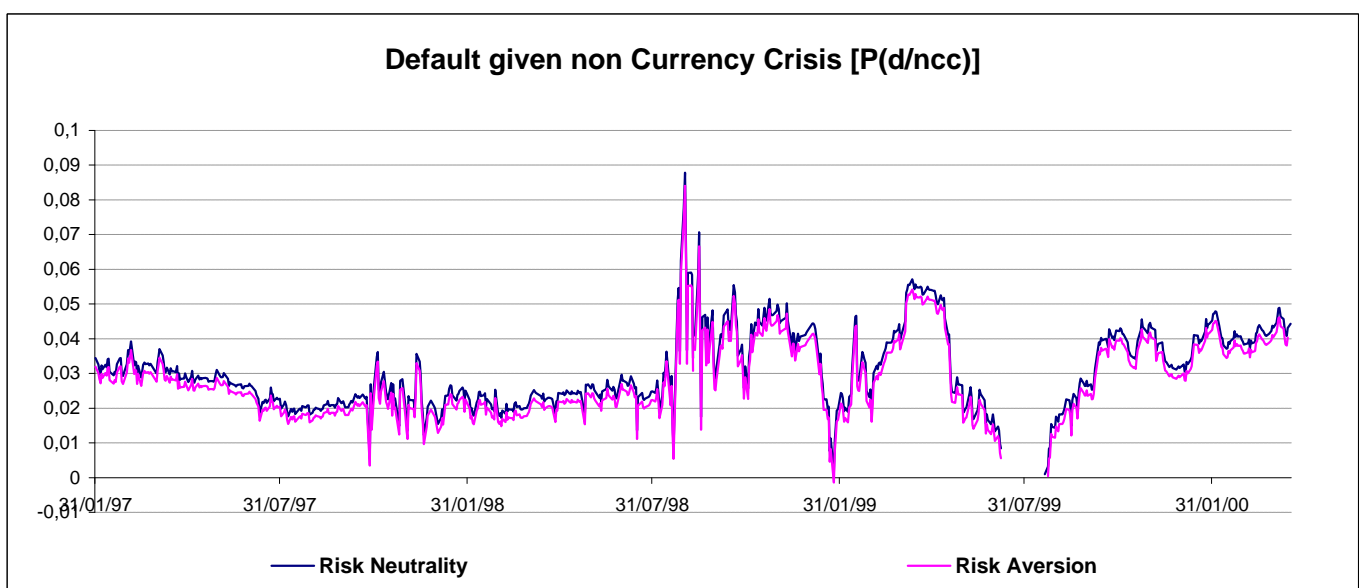
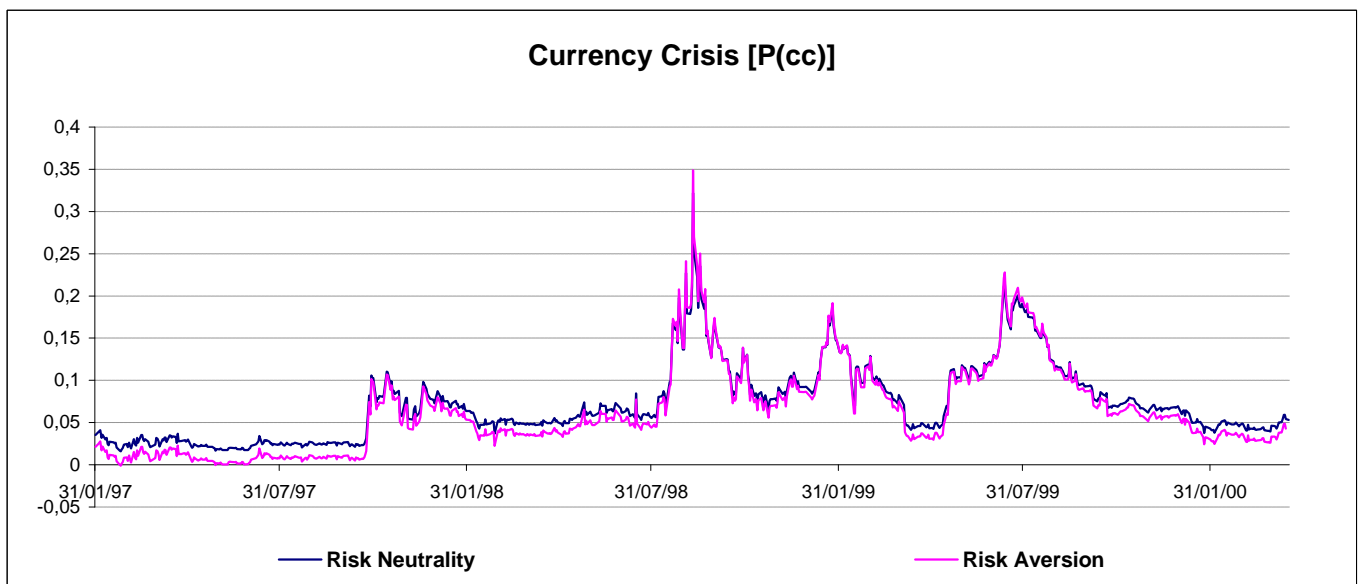
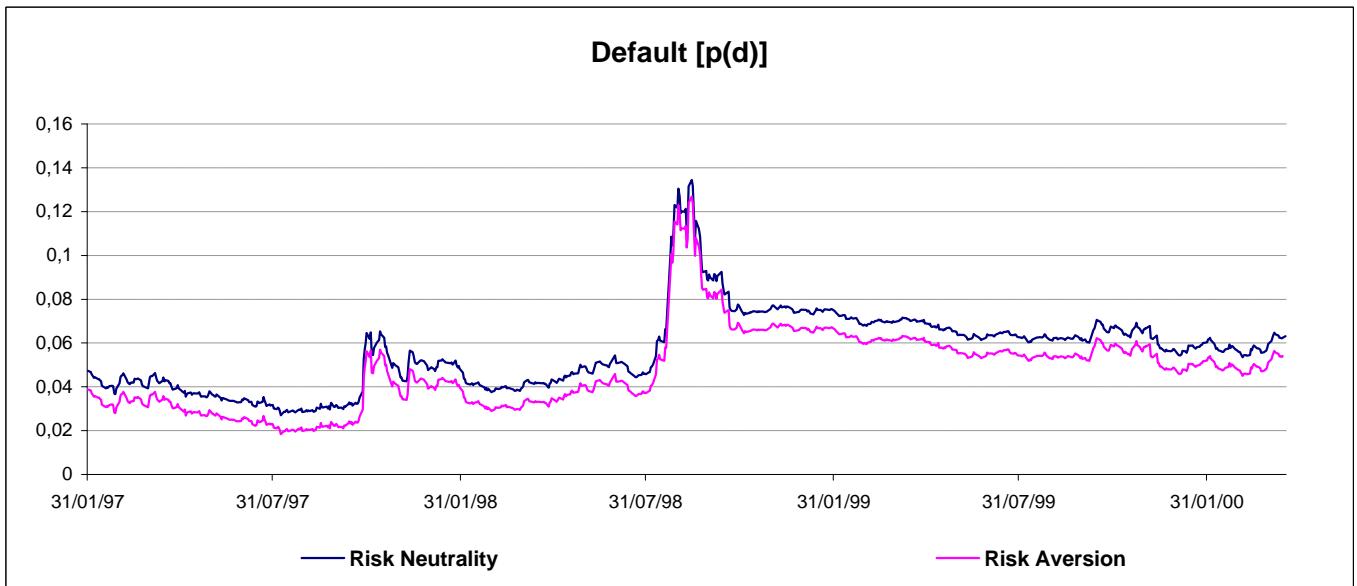
Brazilian Crisis and After: Jan99-May00

		P(d/cc)			
		20%	40%	60%	80%
Devaluation Rate	20%	2,3%			
	40%	3,8%	1,5%		
	60%	4,3%	2,5%	0,8%	
	80%	4,5%	3,0%	1,6%	0,1%

Probabilities:

$[\delta=60\%, P(d/cc)=40\%]$

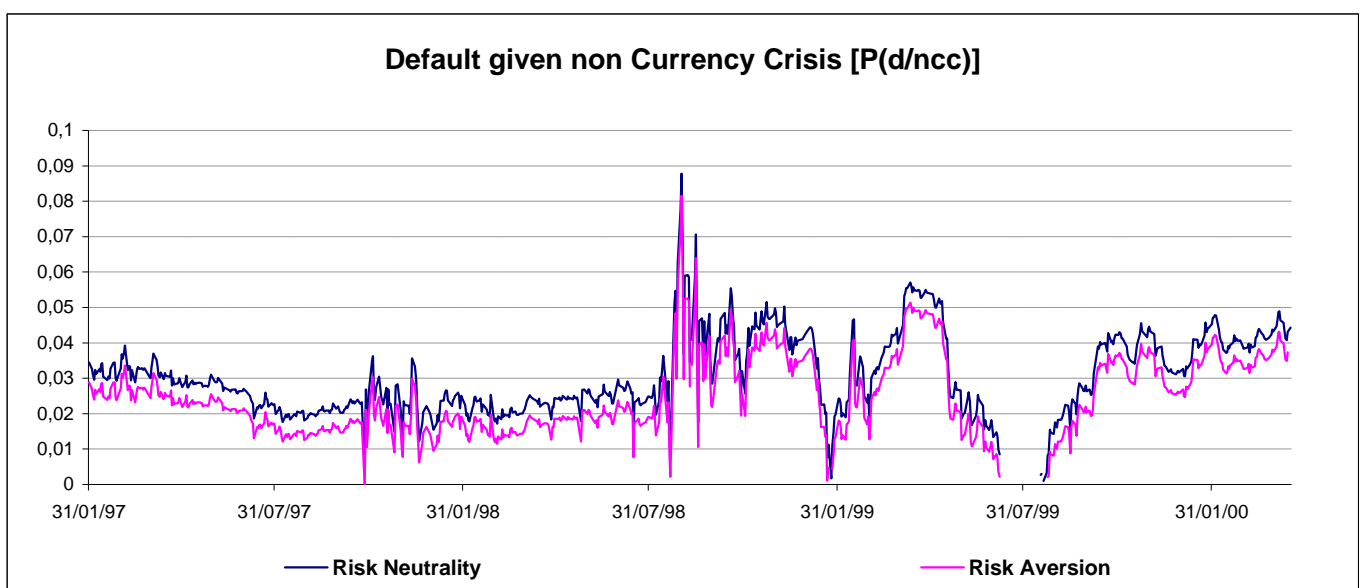
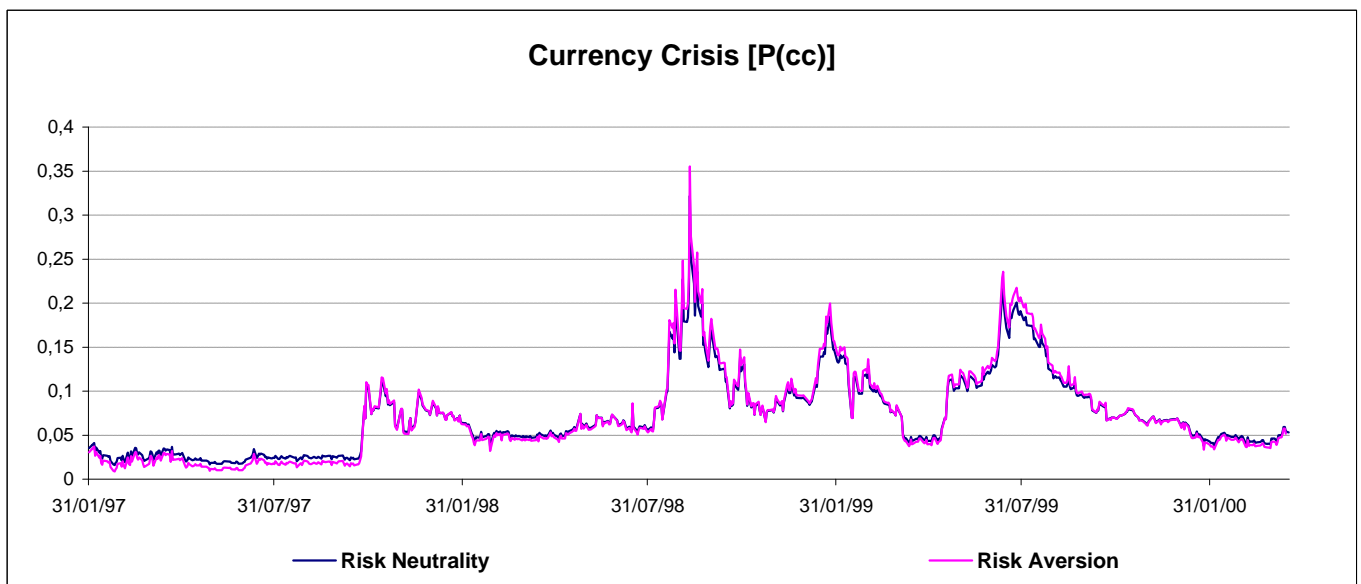
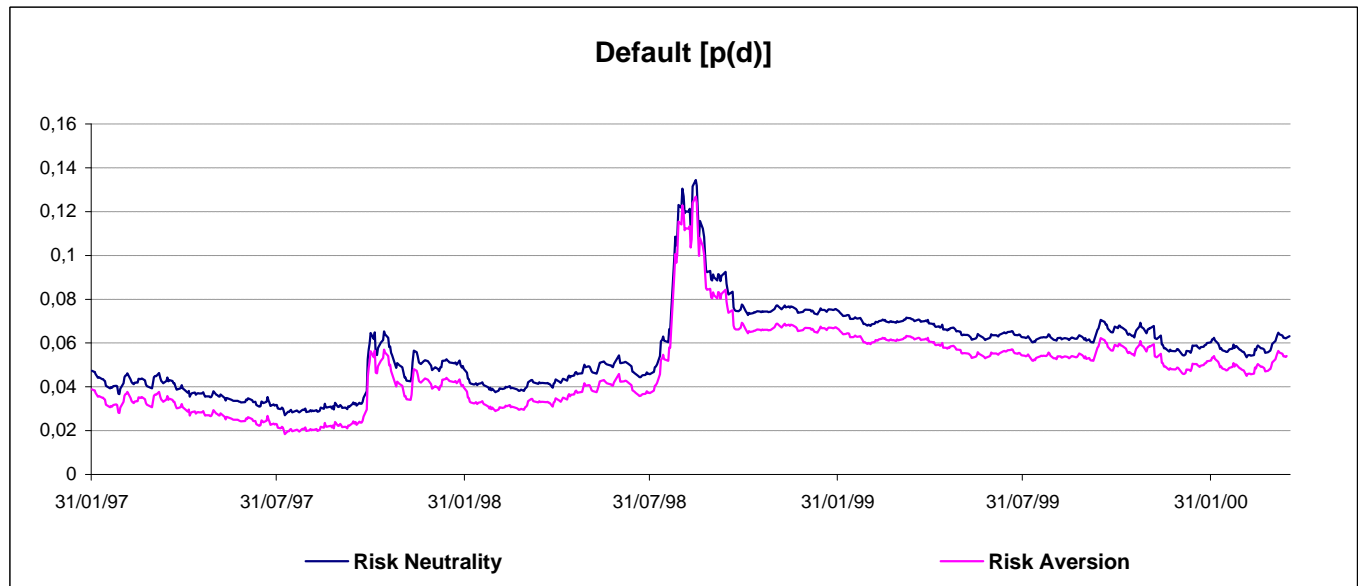
Devaluation Risk premium = Default Risk Premium



Probabilities:

$[\delta=60\%, P(d/cc)=40\%]$

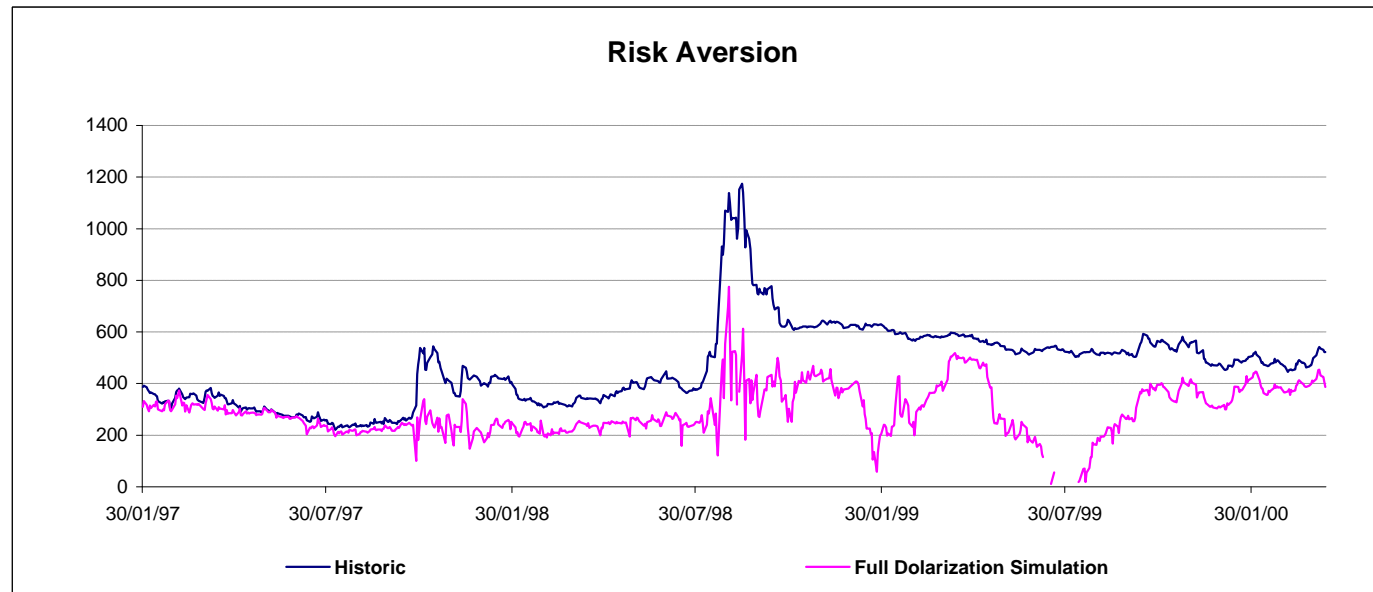
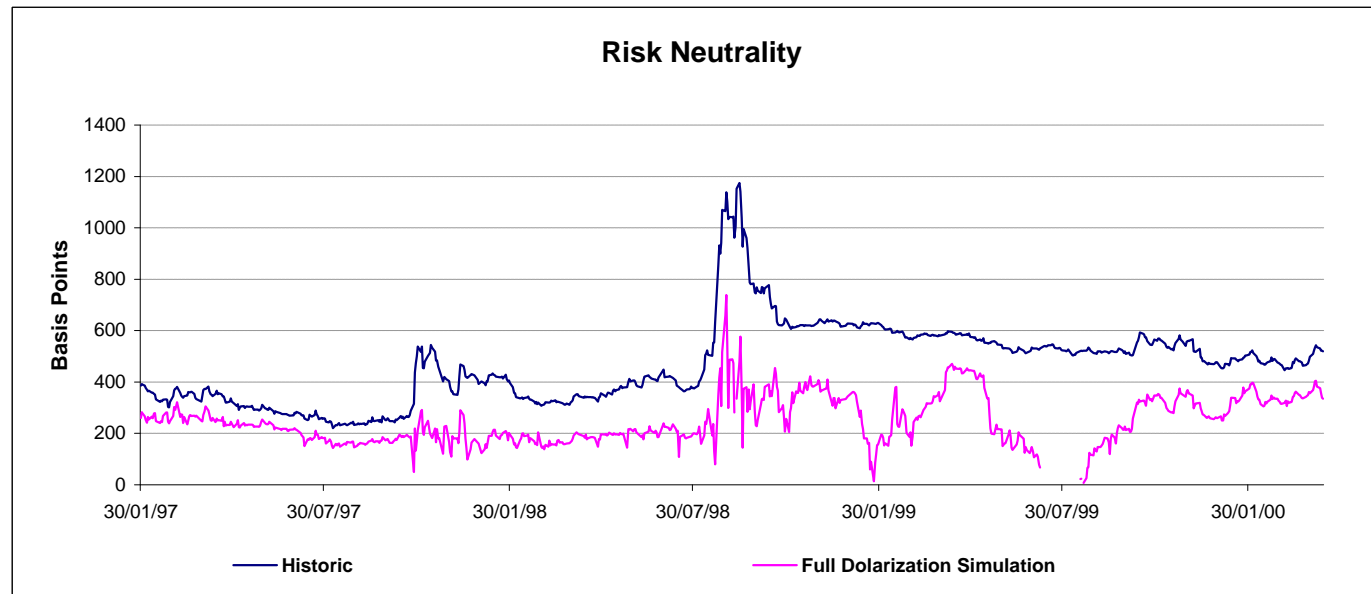
Devaluation Risk Premium = 1/2 Default Risk Premium



Default Risk

[$\delta = 60\%$, $P(d/cc) = 40\%$]

Devaluation Risk premium = Default Risk Premium



Default Risk

[$\delta = 60\%$, $P(d/cc) = 40\%$]

Devaluation Risk Premium = 1/2 Default Risk Premium

