SM/08/158
Correction 1

June 23, 2008

To: Members of the Executive Board

From: The Secretary

Subject: **Senegal—Selected Issues**

The attached corrections to SM/08/158 (6/3/08) have been provided by the staff:

Factual Errors Not Affecting the Presentation of Staff's Analysis or Views

Page 3, para. 3, line 1: for "an exchange rate misalignment" read "a REER overvaluation"

Page 8, para. 11, line 9: for "misaligned" read "overvalued"

Page 10, para. 16, line 1: for "a misalignment" read "an overvaluation"
line 4: for "misalignment" read "deviation"
bullet 2, line 1: for "misalignment" read "deviation"
bullet 3, line 2: for "misalignment" read "deviation"
footnote 10, line 3: for "misalignments" read "deviation"
footnote 11, line 1: for "misalignment" read "deviation"
footnote 14, lines 1 and 2: for "misalignment" read "deviation"

Page 11, heading of Figure I.8: for "Misalignment" read "Deviation"

Page 12, para. 20, line 2: for "a misalignment" read "an overvaluation"
line 6: for "misalignment" read "an overvaluation"

Page 18, para. 26, line 1: for "misalignment" read "overvaluation"

Questions may be referred to Mr. Mueller (ext. 35638), Mr. Lakwijk (ext. 38819), and Mr. Roudet (ext. 35927) in AFR.

This document will shortly be posted on the extranet, a secure website for Executive Directors and member country authorities.

Att: (6)

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Department Heads

I. Senegal—Assessment of the REER and External Competitiveness[1]

A. Introduction

1. **Senegal's export performance has been far from impressive in recent years.** The country has steadily lost its share in world export markets, and its net exports have contributed negatively to economic growth. Exports are not well diversified, mainly from the primary sector, and concentrated in products that have experienced below-average growth in volumes compared to world exports. These developments point toward a problem with external competitiveness and raise questions about the appropriateness of the real effective exchange rate (REER) and Senegal's business environment.

2. **This chapter analyzes Senegal's REER and external competitiveness.**[2] A REER significantly above its equilibrium, as determined by economic fundamentals, can impede a country's external competitiveness, calling for corrective macroeconomic measures. In the same vein, structural impediments in the economy, mainly with respect to the business environment, could hamper external competitiveness and depress export performance, which would require structural reforms to induce a diversification of exports into more promising areas.

3. **This chapter finds no conclusive evidence of a REER overvaluation~~n exchange rate misalignment~~, implying that structural reforms are key to improving Senegal's external competitiveness.** The recent REER appreciation may nevertheless reflect rising production costs, which can be addressed through business environment reforms. Structural performance indicators suggest that substantial barriers to private sector development hinder Senegal's external competitiveness. Reforms should focus on improving infrastructure, education, the provision of health services, the legal, regulatory, and administrative framework, labor markets, financial sector intermediation, and governance.

4. **The remainder of the chapter is structured as follows.** Senegal's export performance is described in Section B. Section C describes developments of the REER, followed by an empirical analysis of the equilibrium REER in Section D, which applies a variety of econometric techniques with the fundamental real exchange rate approach and the macroeconomic balance approach. Structural measures of competitiveness are illustrated in Section E, followed by a concluding Section F with policy recommendations.

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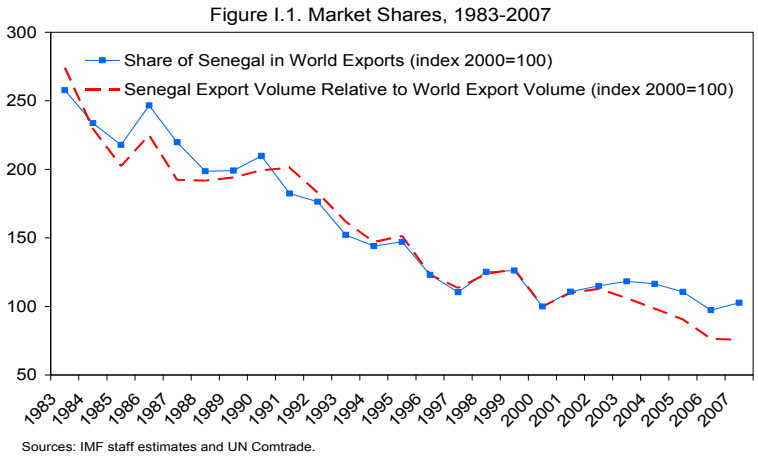
[1] Prepared by Pritha Mitra (PDR).

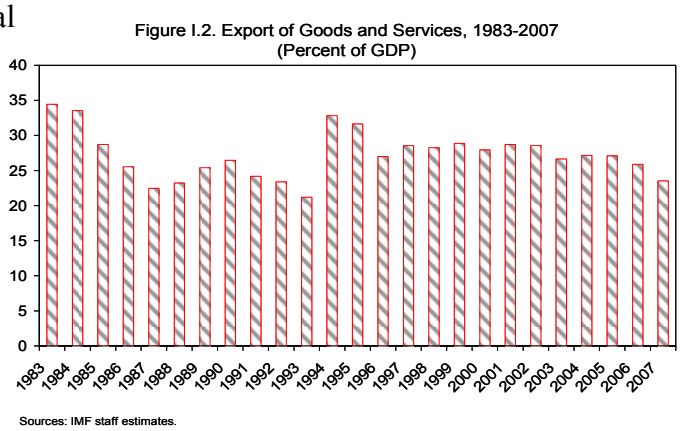
[2] A country's external competitiveness is not only reflected in its export performance but also the ability of domestically produced products to compete with imports. Due to insufficient data on the performance of Senegalese products in relation to imports, only export performance is discussed in this chapter.

B. Senegal's Export Performance

5. **Senegal's export sector performed poorly over the last two decades** (Figure I.1). Strikingly, its share in world exports has been steadily eroding in both value and volume, with the 1994 CFA franc devaluation halting this process only briefly. In volume terms, Senegal's share of world exports was almost 80 percentage points lower in 2007 than in 1995.



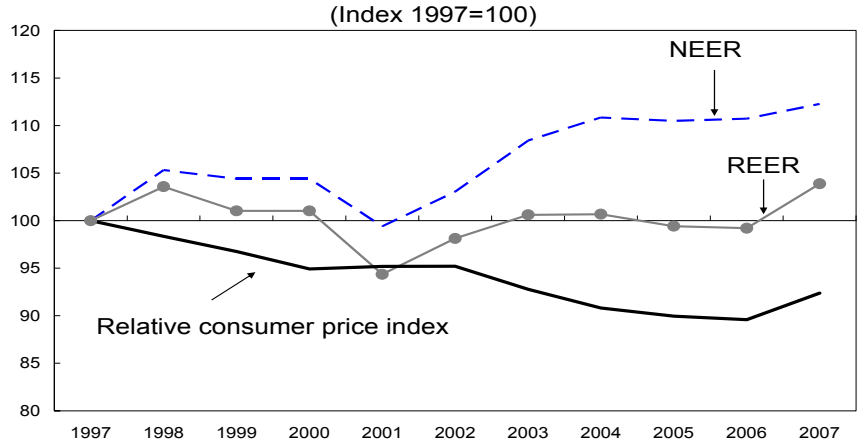
6. **The 1994 CFA franc devaluation did not have a lasting effect on raising export performance** (Figure I.2). This illustrates the limited scope of an exchange rate adjustment in boosting exports, if underlying structural obstacles continue to hamper business activity. At present, exports are only 5 percent of GDP higher than they were in 1993, prior to the devaluation. While the devaluation boosted exports by over 10 percent of GDP initially, about half of this increase dissipated over the following years.



- The REER based on unit labor costs (ULC) shows an even greater appreciation of more than 20 percent since 2001, owing to rapidly rising Senegalese labor costs. In recent years, the shortage of high-skilled labor, especially expatriates, has resulted in large increases of private sector salaries.[4]

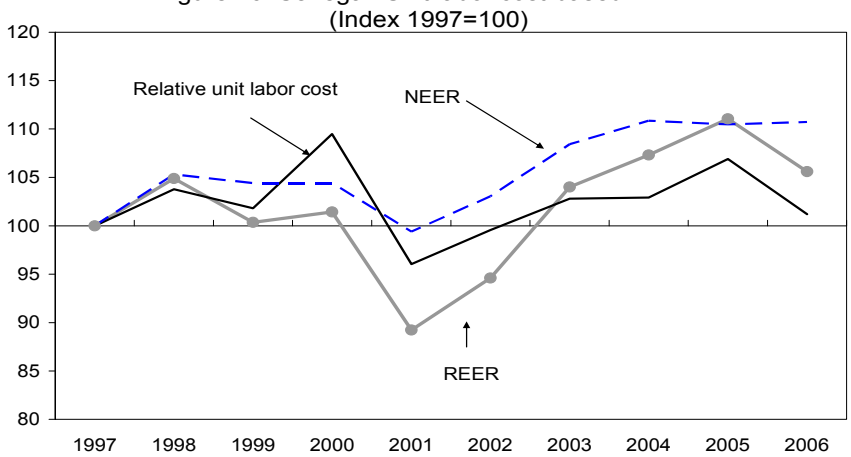
- The CPI-based REER is applied in the empirical analysis of this chapter, as it has a sufficiently long time series. The short time series of the ULC-based REER precludes its application in econometric analysis.

Figure I.5. Consumer price index-based REER
(Index 1997=100)



Source: IMF staff estimates.

Figure I.6. Senegal: Unit labor cost-based REER
(Index 1997=100)



Sources: World Bank; IMF estimates.

10. **The actual extent of REER appreciation is likely to lie somewhere between the CPI-based REER and the ULC-based REER.** The CPI-based REER may understate the

[4] World Bank (2007b) provides more details. Recently, the demand for expatriate and other high-skilled workers has exceeded the supply. The subsequent growth in their wages (estimated at more than 25 percent per annum) exceeds the relative productivity gains, pushing up unit labor costs.

growing cost of Senegal's exports, since (i) consumer prices include the price of imported final goods which are unrelated to domestically produced goods; and (ii) controls on some utility and transport prices included in the CPI understate the cost of production in Senegal. On the other hand, the ULC-based REER may overstate the extent of REER appreciation, since labor costs are not the only costs of production.

A. Empirical Analysis of the Equilibrium REER

11. **Comparisons of the actual REER with its equilibrium level may help identify macroeconomic imbalances.** The equilibrium REER is one in which the economy is both in internal balance—low unemployment and low inflation—and external balance—defined as a sustainable long-term current account position.[5] If a country faces a persistently high unemployment rate, or a persistently high current account deficit, a REER adjustment—through nominal exchange rate depreciation or subdued wage growth—is needed to restore the equilibrium. The fundamental equilibrium exchange rate (FEER) approach and the macroeconomic balance approach are applied to assess whether Senegal's REER is ~~misaligned~~overvalued relative to its equilibrium value.

FEER approach

12. **The FEER approach assumes the equilibrium REER is a function of its fundamental determinants: the terms of trade, productivity, and investment.** Openness and government consumption are also commonly applied fundamentals in the FEER analysis. For Senegal, these two variables turn out to be not quantitatively significant in estimating the equilibrium exchange rate and are excluded from the analysis. They may not be significant because of strong indirect effects on the REER. For example, openness may impact the REER through the terms of trade, and government consumption through productivity and government investment.

13. **The expected relationships between the variables is as follows:**

- The REER and terms of trade are expected to be positively correlated. An increase in the terms of trade corresponds to increased demand and increased relative prices for domestically produced goods, resulting in a higher REER.
- Productivity, a measure of technological progress proxied by real GDP per capita in Senegal relative to its trading partners, is also expected to be positively correlated with the REER. An increase in productivity raises relative wages, and thus relative prices, increasing the REER.

[5] This concept of equilibrium REER for developing countries is based on the fundamental equilibrium real exchange rate framework of Edwards (1989) and Williamson (1994) where internal equilibrium is defined as the present and future clearing of the nontradable market.

- Investment, defined as the sum of private and public investment as a share of GDP, is expected to be negatively correlated with the REER. Given that Senegal has a high import content in investment, higher investment will increase import consumption, decreasing the REER.

14. **The model is estimated by applying four econometric estimation techniques.** These are the Autoregressive Distributed Lag (ARDL), Johansen, fully-modified ordinary least squares (FMOLS), and pooled mean group (PMG) approaches.[6] Their specific features are as follows:

- The *ARDL* and *Johansen* approaches estimate the equilibrium exchange rate based on time series data for Senegal. While the Johansen method is the classic approach for determining long-run relationships, it requires that all variables are integrated of order one. The ARDL approach, however, is independent of individual variables' order of integration. Small-sample performance of the ARDL bounds testing approach has been shown to be superior to the conventional Johansen approach.
- The *FMOLS* and *PMG* approaches estimate the equilibrium exchange rate for Senegal using information from panel data for all WAEMU countries. This allows for greater estimation precision, but the estimation results may be misleading to the extent that Senegal is different from other WAEMU countries. The model was estimated on annual data for the natural logs of the REER and its fundamentals over the period 1970–2007.[7] The panel includes the corresponding data for all WAEMU countries.

15. **The estimation results confirm the expected relationship between Senegal's REER and its fundamentals** (Table I.1).[8] Improvements in productivity and the terms of trade appreciate the REER while increased investment depreciates it.

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[6] See Pesaran, et al. (2001) for details on the ARDL, and Johansen (1988, 1991, 1995) on the Johansen approach. Pedroni (2000) describes the FMOLS approach. The PMG approach is explained in Pesaran, et al. (1999).

[7] All variables have a unit root applying the Augmented Dickey-Fuller unit root test at the 1 percent level. The bounds test for a level long run relationship in the ARDL model was significant at the 5 percent critical value band tabulated in Pesaren, et al. (2001). The Johansen cointegration method finds one cointegrating vector, implying the existence of one long-run relationship.

[8] The FEER estimation approach is based on applications of this approach to WAEMU countries in Roudet, et al. (2007). The results are broadly consistent with their analysis.

Table I.1: FEER Parameter Estimation Results

	ARDL		Johansen		FMOLS		PMG	
	Coef	t-stat	Coef	t-stat	Coef	t-stat	Coef	t-stat
Constant	0.99	…	-0.97	…	4.01	…	5.55	…
Terms of Trade	0.83	3.43	1.28	9.06	0.32	5.03	0.23	1.62
Productivity	1.05	5.77	0.92	9.31	0.44	9.19	0.76	4.11
Investment	-0.03	-0.23	-0.07	-1.25	-0.19	-5.67	-0.58	-4.79

Sources: IMF staff calculations.

16. **The FEER approach does not provide conclusive evidence of an overvaluation ~~misalignment~~.** The equilibrium REER for each year in the sample is calculated by fitting long-run values of each of the fundamentals to the parameter estimates from each estimation method.[9] The resulting ~~misalignment~~deviation bounds, showing the maximum percent deviation of the actual REER from the equilibrium REER under the different econometric techniques,[10] are relatively large, albeit smaller in the post-1994 devaluation period (Figures I.7 and I.8):[11, 12]

- *Prior to the 1994 devaluation*, Senegal's REER experienced a substantial overvaluation of between +15 percent and +75 percent.
- *Immediately after the devaluation*, the ~~misalignment~~deviation is estimated at between -15 percent to -45 percent.
- *Over the last decade*, the deviation of the actual REER from its equilibrium has been relatively small. The deviation~~misalignment~~ bounds do not provide conclusive evidence of an over- or undervaluation of the REER.[13]
- *During 2007*, this trend continued, since the estimated deviation of the REER from its equilibrium ranged between -10 percent and +15 percent.[14]

[9] Long-run fundamental values are approximated by taking a three-year moving average of each variable.

[10] The results from each estimation technique are generally equally relevant. However, the Johansen approach's inferior small-sample performance relative to the ARDL approach (see paragraph 14) may justify placing a smaller weight on its results. This would not change the deviation~~misalignments~~ bounds.

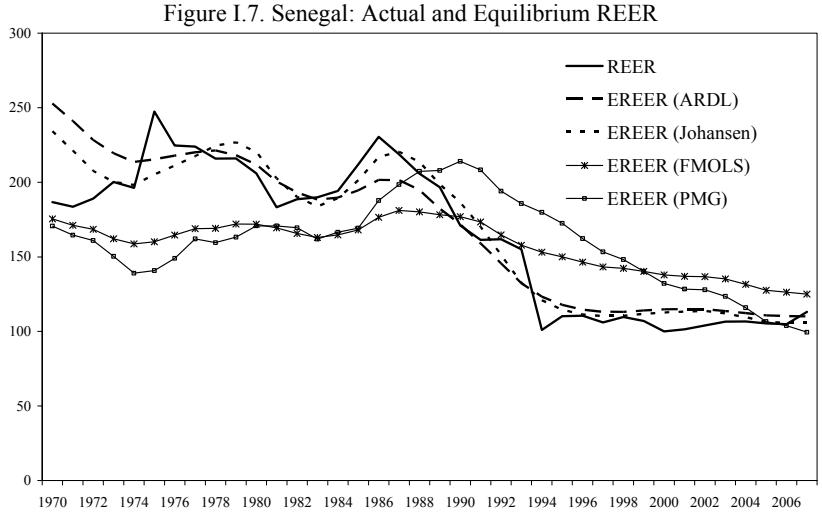
[11] The deviation~~misalignment~~ bounds do not take into account the statistical uncertainty surrounding the point estimates underlying this maximum deviation.

[12] Given the small sample, data inconsistencies, and low frequency of the data, these econometric results must be used with caution. Alternative estimation techniques and models may yield different conclusions.

[13] Estimations which include a dummy for the 1994 devaluation yield similar results.

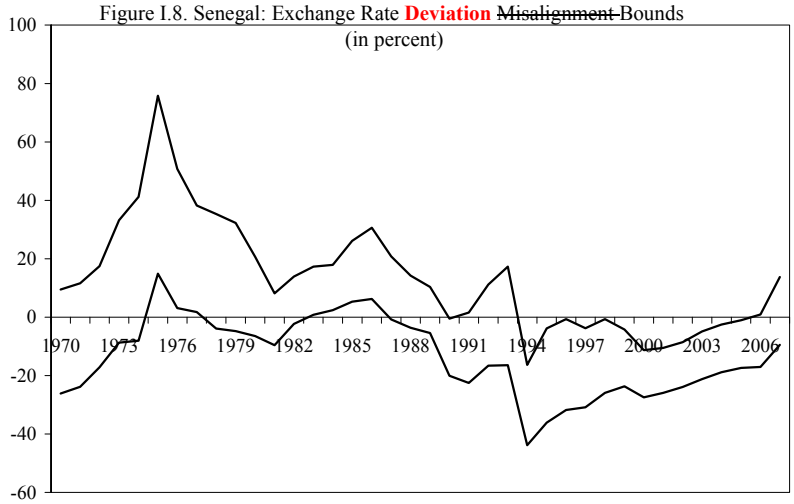
[14] The 95 percent confidence interval accompanying the deviation~~misalignment~~ bounds for 2007 is –15 percent to +25 percent. Statistically, this implies that the estimated REER deviation~~misalignment~~ is not significantly different from zero.

Figure I.7. Senegal: Actual and Equilibrium REER



Source: IMF staff calculations.

Figure I.8. Senegal: Exchange Rate **Deviation** ~~Misalignment~~ Bounds
(in percent)



Source: IMF staff calculations.

Macroeconomic balance approach

17. **The macroeconomic balance approach estimates the REER adjustment needed to close the gap between the projected current account balance, as implied by macroeconomic fundamentals, and its long-run equilibrium value.** The current account (CA) balance implied by fundamentals is called the CA "norm." It is derived in two steps:

- an econometric estimation of the equilibrium relationship between the CA balance and its fundamentals for low-income countries; and
- the application of the parameter estimates to Senegal's medium-term fundamentals to obtain the CA norm for Senegal.

18. **The long-run equilibrium CA balance, also called the underlying CA balance, is the CA balance stripped of all temporary factors, including imports associated with FDI.** If the REER is perfectly aligned with its long-run value, then the CA norm will be the same as the underlying CA balance. Otherwise, the REER adjustment needed to bring the CA norm to the level of the underlying CA balance represents the deviation of the REER from its equilibrium value.[15]

19. **The CA norm for Senegal is estimated to be 6 percent of GDP, and the underlying CA balance is 5 percent of GDP.**

- The *CA norm* was derived from the parameters estimated by regressing the CA on the following macroeconomic fundamentals for low-income countries (LICs): fiscal balance, net foreign assets relative to GDP, relative income, per-capita GDP growth, and population growth (Box I.1).

- The *underlying CA balance* is the balance consistent with (i) historical trends prior to the recent large influx of FDI; and (ii) the forecast CA balance once stable levels of FDI and related export production are achieved.

20. **The macroeconomic balance approach also does not provide conclusive evidence of an overvaluation ~~misalignment~~.** The analysis finds that a depreciation of less than 8 percentage points would close the gap between the norm and underlying CA balance.[16] Qualitatively, this implies that the REER is above its equilibrium value. However, the small magnitude of REER deviation from its equilibrium and the statistical error associated with the estimation prevent a conclusive finding of an overvaluation~~misalignment~~.

[15] This is derived by using the elasticity of the current account balance to the REER. See IMF (2006) for more details on this methodology.

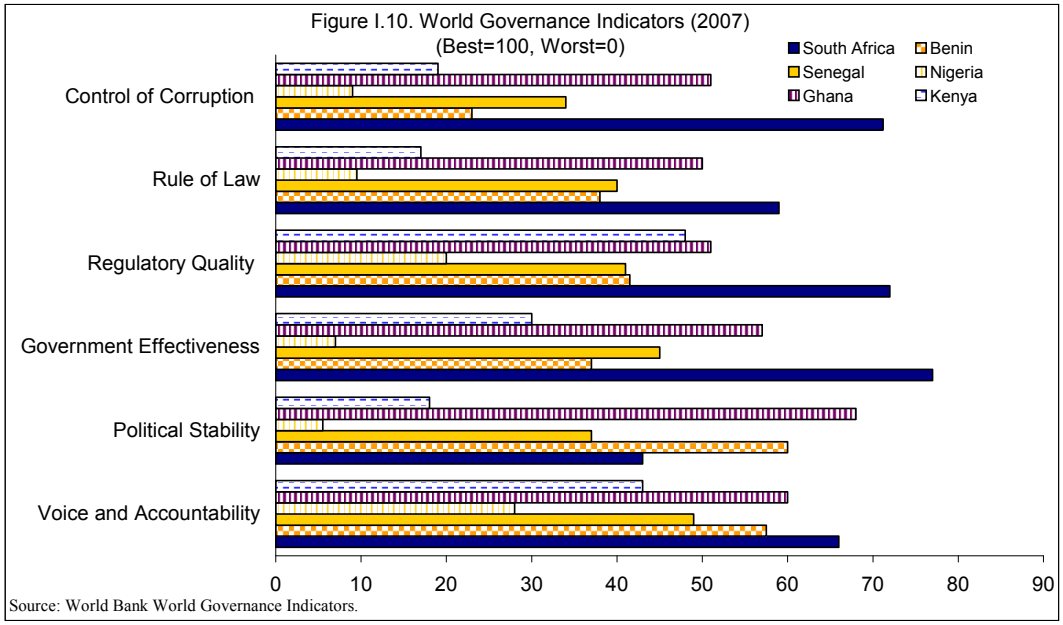
[16] The adjustment depends on the exchange rate elasticity of the CA, which is identified by applying trade elasticity estimates from single-equation models of export and import demand. The estimated export (import) elasticity is 0.37 (-1.16).

Table I.5: Social Indicators, 2005

	Senegal	Benin	Cameroon	Mali	Guinea	Sub-Saharan Africa	LIC
Life expectancy at birth (years)	56	55	46	49	54	47	59
Fertility rate (births per woman)	5	6	5	7	6	5	4
Mortality rate (infant, per thousand live births)	61	89	87	120	97	96	75
Mortality rate (under 5, per thousand live births)	119	150	149	218	160	163	115
Measles immunization rate (percent, ages 12-23 months)	74	85	68	86	59	64	65
Adult literacy rate (percent)	39	35	68	24	30	59	53
Gross enrollment ratio (percent school age population)							
Primary	78	96	117	66	81	95	104
Secondary	21	33	44	24	30	32	46
Tertiary	5	…	6	3	3	5	9

Sources: World Bank, World Development Indicators (2007); and UNDP, Human Development Report (2007).

25. **Improved governance can also boost Senegal's competitiveness.** It has been shown that small improvements in governance can sharply improve a country's competitiveness. For example, Wei (2000) finds that reducing the level of corruption in Mexico to that of Singapore would have the same impact as reducing the corporate income tax by 30 percent. Although Senegal ranks high in voice and accountability—measuring civil liberties, citizens' participation in government selection, and government accountability towards citizens—in the World Bank's *World Governance Indicators*, corruption and inefficient administration hold the country back (Figure I.10 and Table I.6). Over the past decade, rather than improving administrative efficiency and reducing corruption, Senegal's position in these crucial areas has significantly deteriorated.



Source: World Bank World Governance Indicators.

Table I.6. Changes in 2007 World Governance Indicators Relative to 1997
(In percentage points)
(+ = improvement, - = deterioration)

	Benin	Senegal	South Africa	Ghana	Kenya	Nigeria
Voice and Accountability	-7.00	2.00	-4.50	20.0	25.5	18.0
Political stability	-14.50	9.00	27.15	30.0	-2.0	30.0
Government Effectiveness	-17.00	-13.00	2.90	18.0	-19.0	7.0
Regulatory Quality	9.45	5.50	19.90	-1.0	18.0	8.0
Rule of Law	-11.50	-5.00	-1.75	11.0	3.0	1.0
Control of Corruption	-5.20	-9.50	-5.20	15.0	9.0	3.0

Source: World Bank, World Governance Indicators.

F. Policy Implications and Conclusions

26. **Given the absence of conclusive evidence of a REER overvaluation~~misalignment~~, policies to improve Senegal's external competitiveness should concentrate on business environment reforms.** Nonetheless, the REER needs to be carefully monitored going forward, as the recent appreciation, if continued, would make Senegal's exports more expensive on world markets.

27. **Survey-based competitiveness indicators point to various areas for reform in the business environment.** Those reforms would set the stage for expanding and diversifying Senegal's export base, improving product quality, and lowering production costs. They should be embedded in prudent macroeconomic policies that create a stable operating environment for the private sector. Specific measures should aim to improve infrastructure, education, the provision of health services, the legal, regulatory, and administrative framework, labor markets, financial sector intermediation, and governance.

28. **The authorities have embarked on those reforms.** For example, they are undertaking significant investment to modernize infrastructure in various areas, such as roads, airports, ports, and energy. Public spending on health and education, which boosts human capital development and labor productivity, is rising. The authorities are also strengthening the judicial system and easing administrative procedures that proved costly to entrepreneurs in the past, such as through the new one-stop window to start a business.

29. **Overall, implementation of the reform agenda would lead to a more attractive business environment that fosters both domestic and international investment in both traditional and new exports.** In the end, Senegal's resilience to changing world prices and markets should be strengthened by these reform efforts.