

## **Algeria: Selected Issues**

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ALGERIA

**Selected Issues**

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Approved by Middle East and Central Asia Department

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## I. DOMESTIC CAPITAL MARKETS AND THE FINANCING OF THE NATIONAL INVESTMENT PROGRAM<sup>1</sup>

### A. Introduction and Summary

1. **The massive national investment program may have a significant impact on financial intermediation in Algeria.** Public enterprises will implement some industrial projects under the national investment program (NIP). Though minor in relation to the public investments financed by the budget, these projects will nevertheless require substantial new credit from Algeria's small banking system. Whether this new credit is provided by banks or by local capital markets will influence the capacity of Algeria's banking system to finance private sector activity.
2. **The fact that public enterprises need significant new financing gives Algeria an opportunity to develop local capital markets.** This means a key role for banks as catalysts for expanding corporate debt markets. Large, transparent borrowers such as public entities typically put capital markets and banks in competition for their debt finance. This process pushes banks toward earning fee income from helping large clients issue bonds, while focusing pure lending on smaller borrowers. Modern banks retain a comparative advantage over capital markets in processing opaque financial information typical of small and medium enterprises (SME) borrowers.
3. **Algeria's local corporate bond market provides a good basis for further diversifying the economy's financing channels.** The government has pursued deliberate policies aimed at developing this market. A modern government debt market was launched in 2002, with maturities now extending to 15 years. The authorities then encouraged large public enterprises to issue corporate bonds. The Algerian corporate market is significantly larger than in other countries at the periphery of the EU-15. Meanwhile, the authorities have launched several initiatives to improve the governance of banks, especially as regards their large credit exposure to public enterprises.
4. **Benefits from further developing Algeria's local capital markets include:**
  - giving banks more time to upgrade their credit practices and risk management;
  - reducing the banking system's exposure to public enterprises; and
  - spurring banks to develop new sources of income through competition with capital markets. These sources include bringing large issuers to the market, managing mutual funds, and developing SME loans.

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<sup>1</sup> Prepared by Gabriel Sensenbrenner. Figures in this paper generally reflect data as of end-2006, unless otherwise indicated. Appendix I.1 lists key financial stocks and flows for the Algerian economy.

5. **The further development of Algeria's capital markets involves:**

- encouraging large public entities to finance NIP-related projects by issuing bonds and further extending bond maturities;
- welcoming issuance by firms incorporated in Algeria and owned by foreign interests;
- launching the commercial paper market;
- maintaining a public debt issuance program that ensures a reliable government yield curve as a benchmark for corporate debt; and
- evaluating ways of boosting secondary trading for government debt, including through foreign participation in the market.

6. **The paper is organized as follows.** Section II analyzes the nexus of bank financing of public enterprises in the ongoing NIP. Section III sets Algeria's local corporate bond market in a cross-country perspective. Section IV develops options for developing local capital markets during the timeframe of the NIP. Section V considers improvements in some aspects of market functioning.

**B. Bank Financing of Public Enterprises in the NIP**

7. **Algeria has embarked on a massive national investment program.** The NIP has two components: (a) the large public investment program financed directly from budgetary resources (115 percent of 2007 GDP); and (b) a small one (5 percent of GDP) undertaken by public enterprises in power, water desalination, and transport systems. Budgetary lending to public enterprises will remain minimal; the government has also ruled out foreign financing. Thus, the banking system is expected to increase credit by more than three quarter over the next few years to public enterprises for NIP-related projects.

8. **Lack of capital and stricter enforcement of prudential rules constrain banks' ability to increase credit at the pace required by the NIP.** Foreign banks established in Algeria had no lending to public enterprises as of end-2006 and are too small to extend significant new credit. The public banks, which represent 90 percent of system assets, also have a small capital base relative to the need for new credit because of the prudential rule on risk concentration to public enterprises. The banking system also lacks long-term funding to match the maturities of credit that certain projects require.

9. **The authorities have taken measures to help the banking system increase lending to public enterprises over the next few years.** The measures help banks to (a) comply with prudential rules on risk concentration; (b) mitigate maturity mismatches; (c) boost lending capacity through higher capital; (d) marshal enough liquidity for the upcoming large disbursements; and (e) sustain credit to SME (Box I.1).

### **Box I.1. Measures to Facilitate Bank Credit during the Time of the NIP<sup>1</sup>**

**To comply with prudential rules on risk concentration**, the treasury provides a guarantee for exposure to a single public enterprise in excess of 15 percent of bank capital. The treasury estimated that the guarantee would cover 90 percent of new NIP-related credit, the rest being the banks' own risk. The banks used 20 percent of the guarantees in 2006. The risk concentration regulation has also been amended to exclude special purpose corporations from group consolidation by using project financing techniques.

**To comply with rules on maturity mismatch**, the treasury assumes maturity risk through the following facility: banks deposit funds with the treasury overnight and it extends them 17-year loans, with a two-year grace period. Banks using the facility can charge up to 3.75 percent interest on long-term credits to public enterprises. The facility amounts to one third of the new credit required by public enterprises under the NIP.

**To increase the banks' lending capacity**, the treasury plans to provide additional tier 2 capital for public banks, which would allow them to increase credit by 25 percent. In addition, (a) remaining loans to public enterprises that were closed in the 1990s were swapped out; (b) the minimum capital of banks was raised to DA 2.5 billion; (c) two foreign banks have obtained licenses; and (d) two foreign banks already established received approval for major expansions.

**To ensure liquidity**, the treasury has encouraged syndicates, and also plans to reimburse ahead of time some portion of the stock of government securities held by public banks as a result of NPL buybacks.

**To sustain the banks' lending to SME**, a large guarantee fund (CGCI-PME) has been created. The new fund can guarantee DA 360 billion of SME investment credit. This represents 35 percent of total credit to the private sector, but 100 percent when credit unrelated to SME investments is subtracted, e.g., consumer loans, mortgages, crop financing, or working capital credit. CGCI-PME is owned 60 percent by the treasury, 40 percent by banks. The precursor of CGCI-PME is FGAR, which was created in 2000 and has since guaranteed less than 2 percent of credit to the private sector.

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<sup>1</sup> Information from Algerian Treasury as of November 2007.

10. **The authorities have also started to restructure public enterprises to boost their ability to qualify for more bank credit** (Box I.2). As was the case in the earlier round of 1997–98, the new round aims to restore key financial ratios of viable public enterprises to levels that conform to standard lending criteria. The authorities expect banks to give more credit on the basis of these new ratios.

11. **These measures have already translated into strong bank credit to public enterprises.** Between July 2005 and June 2006, only 14 percent of bank credit flows went to public enterprises. This rose to 64 percent in the period between July and December 2006.<sup>2</sup>

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<sup>2</sup> Bank of Algeria (2007).

### Box I.2. Financial Restructuring of Public Enterprises<sup>1</sup>

Algeria undertook a major financial restructuring of public enterprises in 1997–98.<sup>2</sup> However, by 2004, many public enterprises had again key financial ratios (e.g., fixed assets/equity, working capital/turnover, etc.) in excess of standard values that banks use for lending. Accordingly, the 2005 Budget Law stipulated that overleveraged, but otherwise viable public enterprises will be restructured financially with budgetary support, including through the buyback of bank debt. The Algerian Treasury concluded the financial analysis of public enterprises in 2006 and announced a program concerning 378 public enterprises (workforce: 108,000) out of 1,002 reviewed (workforce: 320,000).

The total cost of the financial restructuring of the 378 enterprises is 4 percent of GDP, of which 3 percent for buying back bank debt and 1 percent as cash injection. Small amounts of tax liabilities and suppliers' credit were also written down. These amounts exclude public real estate developers at CNEP, which are estimated to cost another 1.8 percent of GDP.

- For 209 enterprises deemed viable (mainly larger entities), the restructuring involved: (a) new equity, in the form of cash, to cover 30 percent of net fixed assets; (b) a buyback of bank debt so that working capital credit does not exceed four months of turnover; and (c) a “supplementary” buyback to bring interest charges below four percent of turnover.
- For 169 nonviable enterprises, the restructuring is limited to buying back debt and covering operating deficits through budgetary allocations until they are closed.

Finally, for 29 other public enterprises, the government will buy back enough bank debt to bring their interest charges below four percent of turnover.

In exchange for their financial restructuring, public enterprises agree to multi-year performance contracts, with quantitative targets for securing their economic and financial viability.

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<sup>1</sup> Information from Algerian Treasury as of November 2007.

<sup>2</sup> See Nashashibi et al. (1998).

12. **The public banks have been so far the main lenders to public enterprises.** Public enterprises represent about 3 percent of employment and one fifth of nonhydrocarbon GDP. Public banks had limited success in preventing NPLs on lending to public enterprises. Periodic swaps of NPLs for government securities—“rachats de créances”—helped the banks remain solvent and liquid (Table I.1).<sup>3</sup> In 2004, the authorities launched reforms aimed at upgrading risk management, efficiency and services of public banks. The main planks of the reform were new managers bound by performance contracts, new boards with specialized committees, and the privatization process of a first bank.

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<sup>3</sup> The carrying cost of swaps has been immaterial to fiscal sustainability in an era of high hydrocarbon budget revenues. See Bank of Algeria (2002) for details on swaps between 1991 and 2001. IMF Country Report No. 04/138 estimated that swaps averaged 4 percent of GDP per year between 1991 and 2002.

Table I.1. Indicators of Financial Intermediation, 2003–07

	2003	2004	2005	2006	latest
	(In percent)				
NHM2/NHGDP 1/	91.4	89.6	88.3	90.0	93.1
Credit to economy/NHGDP	40.6	36.2	33.3	30.1	27.5
	(In billions of Algerian dinars)				
Credit to private sector	589	675	897	1,057	1,143
Public enterprises, net of swaps	792	860	883	850	898
<i>Idem, including "rachats de créances"</i>	1,349	1,414	1,517	1,563	...
Government securities--"Rachats de créances" 2/	557	554	634	713	616
Government securities--auctioned	221	253	240	282	315
Corporate bonds outstanding	7	56	109	160	170
<i>Of which: Private placements</i>	7	42	79	107	...
Assets of financial system					
Banks	3,534	3,893	4,205	5,382	6,120
<i>Of which: Public banks</i>	93%	92%	91%	92%	...
Nonbank financial institutions 3/	197	212	246	316	...
State insurance and pension reserve funds 4/	100	...	...	144	...
GDP	5,264	6,128	7,499	8,461	9,110
Nonhydrocarbon GDP	3,395	3,808	4,146	4,578	5,021

Sources: Algerian authorities; and Fund staff estimates.

1/ NHM2 = M2 - Sonatrach deposits in the banking system; NHGDP = GDP - hydrocarbon GDP.

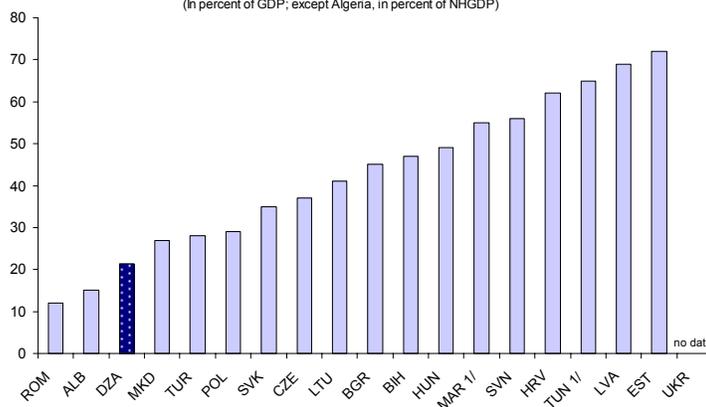
2/ Bilateral swaps of government securities for bank claims on public enterprises, mostly NPLs.

3/ Mainly insurance companies and postal accounts (CCP).

4/ Unemployment insurance fund, medical benefits fund, and pension reserve.

13. **Credit to the private sector remains small by international standards, despite its recent rapid growth.** Lack of capital has constrained the banks in developing credit to the private sector.<sup>4</sup> The public banks' capital is only 4 percent of nonhydrocarbon GDP. This small capital allows low overall credit because of capital adequacy rules. Since a significant share of credit still goes to public enterprises, the scope for private sector credit is small.

Figure I.1. Credit to the Private Sector in Selected Countries, 2005  
(In percent of GDP; except Algeria, in percent of NHGDP)



Sources: ECB, and Fund staff estimates.  
1/ Including public enterprises.

<sup>4</sup> Algeria's ratio is expressed in percent of nonhydrocarbon GDP to facilitate comparison with countries with no hydrocarbon sector and because Algeria's hydrocarbon sector does not borrow.

14. **More credit to public enterprises may distract banks from developing the practices and products to finance private sector activity. In particular:**

- a. instilling a modern risk culture in the banking system becomes more challenging;
- b. large new lending to public enterprises will ensure several years of good earnings for the banking system, thus weakening incentives to develop other sources of earnings from financing private sector activity; and
- c. the playing field in banking would remain distorted. The government has accepted a low return on equity for the banks it owns. This allows them to compete with the foreign banks, which require returns that are 4–5 times higher.

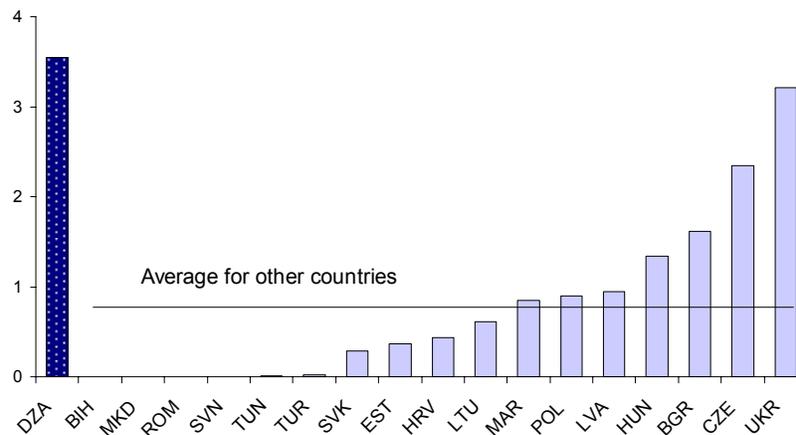
15. **By contrast, the new credit needs of public enterprises are an opportunity to further develop local capital markets.** Banks would facilitate access by large corporate clients to the debt markets, while focusing pure lending increasingly on SME.

### C. Algeria's Corporate Bond Market

16. **The Algerian market is already sizeable and maturities are long.** The government has encouraged large nonfinancial public enterprises to issue bonds since 2003. Two private entities have followed suit in 2006. Maturities extend to 11 years, with a median of six, partly reflecting the tax advantage given to maturities exceeding five years. The stock of bonds is equivalent to half of public enterprises' medium- and long-term bank credit.

17. **The Algerian market is larger than in other countries on the periphery of the EU-15.** The Algerian market is about four times larger than the average for these countries.

Figure I.2. Nonfinancial Corporate Bonds in Selected Countries, 2005–06 Average  
(Outstanding in percent of GDP; except Algeria, in percent of NHGDP)



Sources: BIS; ECB; and Fund staff estimates.

Market size is measured by the outstanding stock of bonds issued by nonfinancial corporations. Only Ukraine has a market of comparable size, reflecting the prevalence of large enterprises in Ukrainian industry.<sup>5</sup>

18. **Some bonds were significantly oversubscribed in 2006, suggesting scope for growth.** The largest issuer is Sonelgaz, the electric utility, which plans to invest about 8 percent of NHGDP until 2009. Half of Sonelgaz's bonds were issued in the seven-eleven year segment. Other large issuers include Air Algérie and Algérie Télécom. The size of the Algérie Télécom 5-year bond of October 2006 was doubled during the public offering period, due to demand.

19. **There has also seen a substantial increase in public offerings compared to private placements in 2006.** Private placements, which are limited to institutional investors, represented three quarter of the value of bonds sold in 2003–05, mostly bought by banks. By contrast, public offerings, which are not limited to institutional investors, accounted for more than half of bonds sold in 2006. This suggests strong demand of the general public for nonbank saving vehicles.

20. **Launching fixed-income mutual funds would be a natural evolution for financial institutions looking for new sources of income.** Mutual funds would be attractive savings vehicle as they could pay at least 150 bp more than term deposits.<sup>6</sup> If 10 percent of term deposits switched to mutual funds, corporate bond issuance could potentially double.

21. **The corporate market took off after the government started issuing its debt more predictably.** Debt issuance through auctions on a regular calendar was introduced in 2002. The aim was to grow the market gradually and ensure reasonable profitability for primary dealers.<sup>7</sup> The yield curve reflects mainly the outcome of auctions because secondary market activity is limited. Thus, a new corporate bond offering may sometimes have to wait until the issuance of a government bond of comparable maturity to provide the market with a reliable pricing point.

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<sup>5</sup> Algeria and Ukraine have by far the lowest density of SMEs among countries on the periphery of the EU-15 (see IMF Country Report No. 06/101).

<sup>6</sup> A mutual fund composed of government bonds (yielding 3–5 percent per year) and corporate bonds (5–7 percent) should yield about 4 percent after expenses. Term deposits earned between 1.25 percent and 2.50 percent in 2006 (except at CNEP).

<sup>7</sup> Primary dealers (PD) are most of the public banks, one foreign bank, and several nonbank financial institutions. The treasury informs PDs of the issuance calendar on a quarterly basis. Auction frequency is weekly. Three days before, the central bank as agent of the treasury informs PDs of intended amounts by type of security. Bids are submitted electronically. Settlement is DVP on the large value system.

22. **Uncertain timing of budgetary outlays under the public investment program has made government debt issuance somewhat difficult to predict in 2007.** The authorities have made provisions for accessing Algeria's oil stabilization fund to finance these outlays. However, each drawing on the fund requires a decision of the minister of finance. The onset of bulky outlays in early 2007 generated large bridge financing requirements. As a result, the stock of auctioned government securities increased by 45 percent in the first two months of 2007, then dropped 20 percent until September 2007. This pattern has contributed to low yields. The yield curve became inverted at short maturities compared to 2006, when its shape was similar to curves of countries with persistent fiscal surpluses and to the euro and dollar curves (Box I.3). Going forward, the authorities plan to increase predictability by stabilizing the debt stock.

23. **New issuance of corporate bonds has been weak in 2007.** The stock of corporate bonds has increased marginally in 2007, from DA 150 billions to DA 170 billions, all in private placements.

#### **D. Further Development of Algeria's Capital Markets**

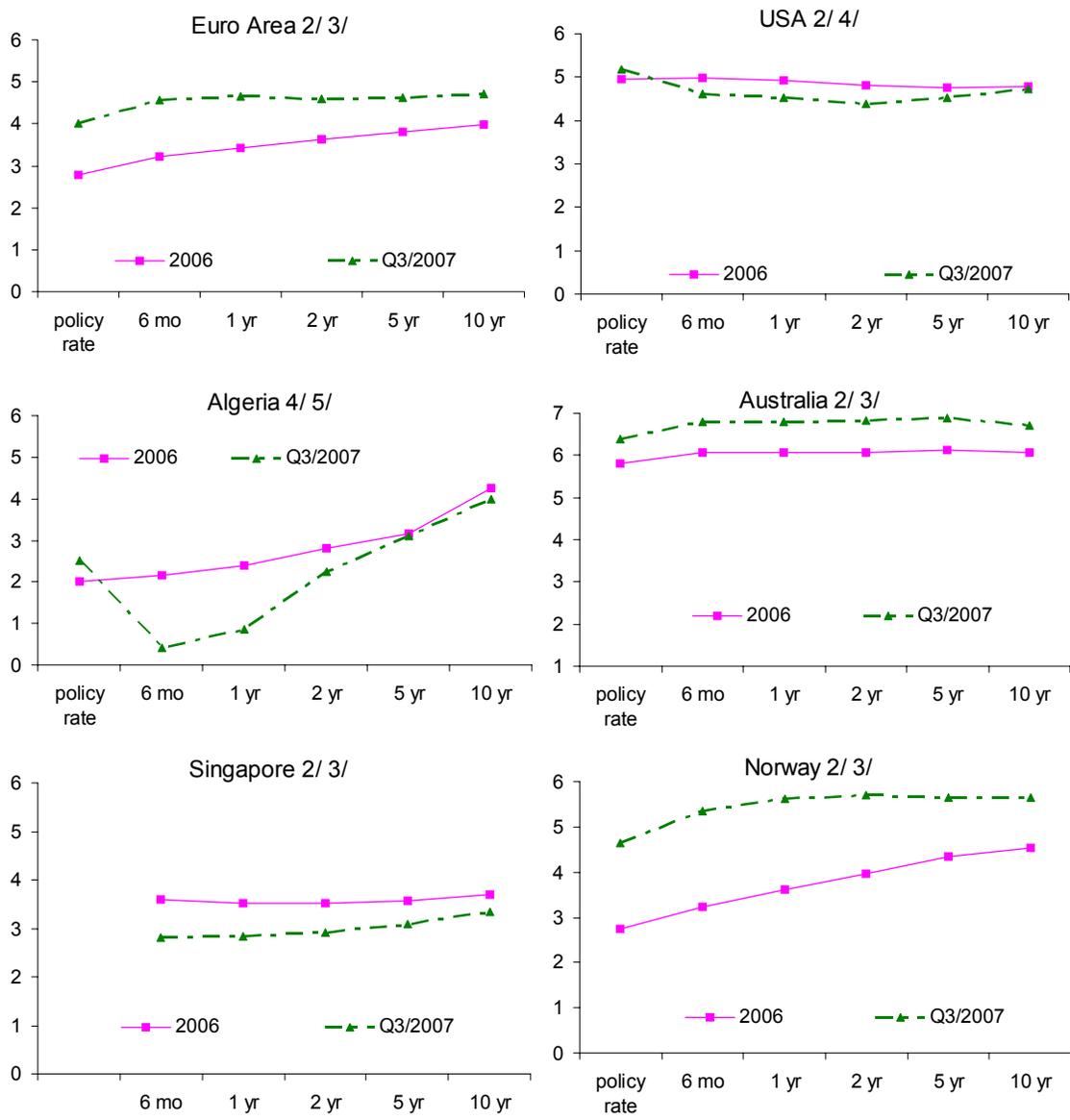
24. **A market for corporate debt securities spurs banks to increase efficiency and innovate.** Capital markets provide debt finance at lower overhead cost than banks, once credit risks become predictable and bond features sufficiently standardized (Box I.4). As a result, banks must innovate by customizing their financing and services to clients with potential access to capital markets. To make up for straight loan income that is lost to the market, banks also direct their lending efforts to other borrowers, such as SME, also because SME loans are too small to justify the fixed issuance costs of capital markets.

25. **A robust financial system requires complementary channels of financing, where banks and markets compete for borrowers.** Through diversification of financing channels, capital markets help cushion the real economy from shocks to bank intermediation, and vice-versa.<sup>8</sup> Greenspan (1999) compared the corporate debt markets to an economy's "spare tire" as Asian banks became reluctant to extend credit. Local currency market finance also helps avoid currency mismatch in the real economy and mitigates maturity mismatch on banks' balance sheets.

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<sup>8</sup> Capital markets stepped in when U.S. banks retrenched in the late 1990s (real estate bubble), and again in late 1998 (Long Term Capital Management). Banks stepped in when capital markets retrenched in 2001 (downgrade of major traditional issuers of commercial paper).

**Box I.3. Yield Curves for Algerian Dinar and Selected Currencies, 2006–07<sup>1</sup>**



Sources: Algerian authorities; Bloomberg; U.S. Treasury; Federal Reserve Board; and Fund staff calculations.

1/ "Policy rate" is short-term rate for borrowing from central banks, except Algeria, rate on 3mo deposit auction for commercial banks.

2/ Yearly averages of daily values, except 2007, average of three quarter.

3/ Market convention: reference curve consists of interest rate swaps.

4/ Market convention: reference curve consists of government securities.

5/ For 2006, yearly average of quarterly values.

### **Box I.4. Key Features of Corporate Bond Markets**

**The corporate market is for borrowers of fairly well-established reputations.** Financing extends from the short term—this is the commercial paper (CP) market of maturities up to one year, to the long term—the bond market *per se*. Issuers are financial institutions (the largest segment in the EU because of covered bonds) and nonfinancial corporations, either residents or nonresidents. Issuers in the market are fairly well-known “names” with acceptable risk characteristics for inclusion in fixed-income portfolios.

**Buyers are typically prudent institutional investors, such as pension and life insurance companies, and investment funds** (money market funds for CP; fixed-income funds for bonds). Mainly for regulatory reasons, institutional investors prefer bonds from reputable “names” with fairly low credit risk. In more advanced stages of development, certain buyers emerge that are willing to take on higher credit risk. At that point, entities with relatively less known track records can also issue in the market.

**Bonds are cheaper than bank loans, for issuers that qualify and for bond offerings of sufficient size.** In advanced financial systems, banks earn very little (a few basis points) on the financing of medium-large corporations, as these have achieved the needed reliability of financial information for accessing capital markets. The size of an individual bond must however be large enough (higher than \$30–50 million equivalent) in order to dilute the overhead costs (legal, regulatory, marketing, custody, etc.). In addition, the terms of bond offerings (maturity, covenants, frequency of debt service, option features, etc.) are typically highly standardized, so that price differences across bonds reflect pure differences in credit risk.

**The banking system benefits from a vibrant bond market in many ways.** Certain banks of long standing reputation can specialize in “bringing issuers to market,” that is, ensuring strong demand for new corporate bond offerings through valuable marketing, distribution, and market-making services. These banks earn fees for arranging, underwriting, marketing, trading, and safekeeping. In addition, a vibrant market ensures a robust stream of information on the price of credit risk for various categories of borrowers. Banks use this information to price individual loans and manage the risk of their loan books. Finally, banks are spurred to innovate in order to retain the business of clients with potential access to market finance.

26. **Competition between the corporate bond market and banks is important for Algeria’s financial sector development.** The earnings of banks in 2006 show the effects of this competition. The banks would have earned DA 4–5 billion more, had the large public enterprises not replaced bank loans with cheaper bonds.<sup>9</sup> The banks’ earnings in 2006 were boosted by income from liquidity absorption operations. Earnings from pure banking, which exclude this exceptional income, were about DA 9 billion. Therefore, bond market competition has lowered bank earnings by about a third, encouraging banks to develop other sources of income.

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<sup>9</sup> The calculation is based on the fact that: (a) bonds have been about 200–300 bp cheaper than bank loans; (b) public banks held some DA 100 billion worth of corporate bonds in 2006, including clients’ securities accounts; (c) various government funds and insurance companies held the balance of some DA 60 billion.

27. **The government could encourage public entities to continue issuing bonds and extending maturities, especially on NIP-related projects.** Public entities comprise public enterprises and other entities that have their own income stream to service bonded debt, for example the new public corporations being set up through project financing (*sociétés publiques de projet*). And also the Algerian banks: they are sufficiently known by the public to issue their own bonds. This would help them diversify funding away from term deposits. Issuance by Algerian public banks would also signal a willingness to be judged by investors, and provide the government with information on their value. Among other countries, Croatia, Czech Republic, and Hungary have seen issuance of significant size by financial institutions.

28. **Issuance by foreign companies incorporated in Algeria would enhance market credibility.** Some such companies have a need for term loans in dinar. These companies are accustomed in other countries to high standards of financial services and would progressively impress these standards on the local financial institutions.

29. **There is no market yet for commercial paper, although the potential is large.** The commercial paper market competes with banks in providing short-term credit to reputable borrowers. Short-term credit is more than half of total credit in Algeria. Some substitution of short-term bank loans by commercial paper is thus possible, as happened with corporate bonds and longer term bank loans. The authorities have largely completed the legal and tax groundwork for the commercial paper market. Some public enterprises could show the way, as they have for bonds, with private entities following, including foreign ones that need working capital finance in dinar.

30. **Corporate debt markets rely on government yield curves for the pricing of new corporate debt securities.** The yield on a new corporate debt security is the sum of the yield on the most recent government security of the same maturity plus a premium for the credit risk of the corporate.<sup>10</sup> The reliability of government yields as a basis for pricing new corporate debt is open to question for governments that have no need to borrow. In these cases, the supply of government securities naturally falls below the demand of investors that have to hold such securities for regulatory purposes and/or cannot invest abroad. In Algeria, government securities of short maturities have recently become insufficient in relation to the regulatory needs of the few and small local insurance firms.

31. **A well-structured public debt issuance program underpins the reliability of the yield curve.** Countries with fiscal surpluses have realized that continued issuance of government debt supports competitive financial intermediation.<sup>11</sup> Continued issuance anchors

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<sup>10</sup> Assuming the same liquidity for both securities.

<sup>11</sup> See Comley and Turvey (2005) for Australia (gross debt: 7 percent of GDP) and Norges Bank (2003) for Norway (gross debt: 17 percent of NHGDP). The Singapore Government increased its gross debt from 20 percent of GDP in 1998 (at the time, mostly held by the state retirement fund) to 40 percent in 2004 with a

a reference term structure of local interest rates, maintains a liquid and efficient government debt market, and facilitates the transmission of central bank decisions on policy rates to the cost of credit in the economy. After careful consultations with market practitioners, some countries have increased gross debt and concentrated issuance on a limited number of benchmark lines to capitalize on these benefits. The Algerian Government may also have to structure its issuance program so as to foster the development of local capital markets.

### **E. Improving the Government Benchmark for Corporate Bonds**

32. **Looking ahead, more secondary trading of government securities would improve the price benchmark for corporate debt securities.** Secondary trading generates more continuous interest rate information than auctions. Meaningful secondary trading develops when a critical mass of investors has frequent needs to restructure their portfolio of securities (increasing or reducing the portfolio; changing its duration). Trading needs arise in greater quantities and at higher frequency, the more heterogeneous the investors' needs and views on economic fundamentals.

33. **More secondary trading will be challenging, because many domestic investors will hold securities to maturity for the foreseeable future.** Some more trading may be possible if public banks, as the largest holders of government securities by virtue of the swaps, were compelled to trade more often. This may involve creating a structural liquidity deficit for more banks.

34. **To address this issue, the authorities may have to consider a combination of:**

- increasing the required reserve ratio to remove liquidity from most banks on a permanent basis. The central bank would continue to pay a market rate on required reserves, to offset any cost to banks of meeting the reserve requirement;<sup>12</sup>
- providing the central bank with government securities that it can sell into the market. Outright sales of government securities remove liquidity via a more price-based mechanism than required reserves;

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view to building large benchmark to develop the corporate bond market. During this time, the stock of corporate bonds increased from 20 percent of GDP to 70 percent of GDP.

<sup>12</sup> The interest rate on required reserves should vary automatically to be always equal to the central bank's rate on its main refinancing operations. In this way, the reserve requirement becomes a pure monetary policy tool for creating or increasing a structural liquidity deficit of the banking system, not a tax on banks. The ECB uses this approach to increase significantly the structural deficit in order to ensure the clarity of its policy signal.

- developing central bank repos of government securities. Banks will feel comfortable buying the above securities if central bank repos ensure their liquidity;
- requiring that interbank loans take the form of repos. Some marginal banks would thus need to increase their holdings of government securities; and
- reducing the frequency of central bank operations from once a week to once every two weeks. Given the slow pace of financial intermediation in Algeria, a bank needing liquidity can afford to wait until the next weekly operation of the central bank, rather than seek an earlier deal in the interbank market. Two weeks may push more banks more often to the market.

35. **Robust secondary trading further ahead will require significantly greater heterogeneity of investors, mainly by allowing foreign buyers.** There is not much scope for diversifying the local investor base. The development of the local pension fund or life insurance industry is constrained by the government's growing financial wealth. This weakens incentives for old-age saving and helps explain that life insurance has failed to develop despite a fairly modern legal framework. Meaningful investor heterogeneity may involve foreign investment into the government securities market.

## Appendix I.1. Key Financial Stocks and Flows, 2006–07

(In billions of Algerian dinars; unless otherwise indicated)

	2006	Sep. 2007
Bank credit to public enterprises	850	...
<i>Of which:</i> medium- and long-term investment credit	440	...
Public enterprise bonds outstanding	...	150
Overall cost of NIP	...	12,044
Public investment program (government budget)	...	10,530
Public enterprises 1/	...	1,514
New credits required for NIP	...	443
<i>Of which:</i> government guaranteed	...	390
Credit to the private sector	1,057	...
<i>Of which:</i> SME investment credits	300	...
New scheme to guarantee SME investment credits 2/	360	...
Government securities outstanding	1,118	...
Auctioned securities	282	...
Swaps " <i>rachats de créances</i> "	713	...
Other	123	...
New swaps planned 3/	318	...
Oil stabilization fund 4/	...	3,195
Banking system deposits	3,516	...
<i>Of which:</i> term deposits	1,766	...
Memorandum items		
GDP	9,110	...
Nonhydrocarbon GDP	5,021	...
International reserves (In billions of US dollars)	...	100
Government external debt	...	0.8
Average DA/\$ exchange rate	73	...

Sources: Algerian authorities; and Fund staff estimates.

1/ Excluding Sonatrach.

2/ Authorized coverage when scheme is fully deployed.

3/ See box 2 for details.

4/ As of end-June.

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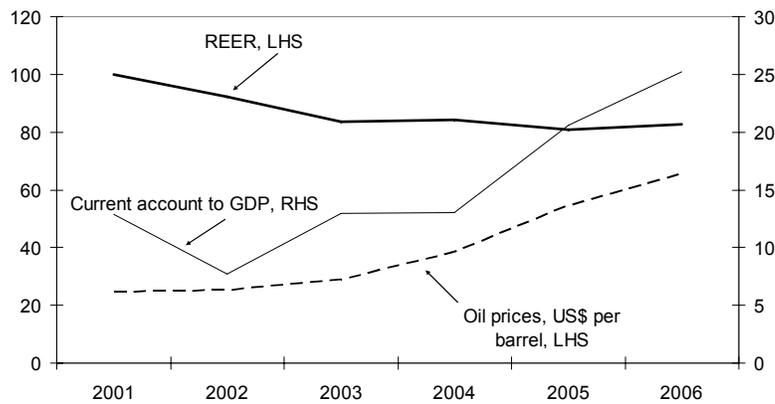
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## II. ESTIMATING THE EQUILIBRIUM REAL EXCHANGE RATE IN ALGERIA<sup>1</sup>

### A. Introduction

1. The behavior of Algeria's real exchange rate over the past few years appears puzzling. Despite the recent surge in world oil prices and the associated large current account surplus, the real exchange rate has remained relatively stable. It even depreciated slightly by about 5 percent during 2001–06, raising questions about the appropriateness of the current exchange rate level.

Figure II. 1. REER, Current Account and World Oil Prices, 2001–06



Source: Fund staff estimates and projections.

2. The purpose of this chapter is to assess whether the level of the real exchange rate is close to equilibrium, taking into account some of the key characteristics of the Algerian economy. We use three different methodologies. In line with IMF Consultative Group on Exchange Rate Issues (CGER) methodologies, we start with a reduced-form “equilibrium real exchange rate” approach and a “macroeconomic balance” approach. The first methodology links the real exchange rate to a set of fundamentals. The second approach quantitatively assesses exchange rates that are consistent with “appropriate” current account positions (external balance) when economies operate close to potential output (internal balance).<sup>2</sup> The results of these two methodologies should be treated with caution given the fragility and uncertainty surrounding econometric estimates, and the inability to fully incorporate all relevant country specific factors in panel regressions.

3. We argue that in a country like Algeria that is endowed with nonrenewable resources conventional methodologies can be misleading or insufficient when assessing the real

<sup>1</sup> Prepared by Boileau Loko.

<sup>2</sup> Further details on these methodologies can be found in Isard and Faruqee (1998) and Isard et al. (2001).

exchange rate. First, the prices of resource-based commodities such as oil are often volatile, with no discernible trends or cycles. Second, the two CGER methodologies use the projections for the final year in the five-year World Economic Outlook (WEO) horizon to estimate the current account norm and the equilibrium exchange rate. The implicit assumption is that in the final year, economies are operating at potential output (steady state). This assumption may not be appropriate for nonrenewable resources producing countries because the nature of nonrenewable resources often implies a difficult portfolio problem in the short run as well as in the long run, including ensuring intergenerational equity. Therefore, we complement the two CGER approaches with a third methodology that links the current account norm to the saving-consumption decision in nonrenewable resource producing countries. All methodologies show no evidence of real exchange rate undervaluation. However, the results should be treated with caution. One reason is that estimating the equilibrium real exchange rate in oil-producing countries remains inherently difficult due to volatile oil prices. Another reason is that the results depend on medium-term projections that are highly uncertain.

4. The remainder of this chapter is organized as follows. Section B assesses the exchange rate using the “equilibrium real exchange rate” approach. Section C presents the results of the “macroeconomic balance” approach. Section D assesses the exchange rate based on the permanent income framework. Finally, Section E concludes.

### **B. Equilibrium Real Exchange Rate Approach**

5. The reduced-form “equilibrium real exchange rate” approach consists of (a) estimating an equilibrium relationship between the real exchange rate and a set of determinants, the so-called “fundamentals;” (b) then using the coefficients and the medium-term values of the fundamentals to compute the equilibrium exchange rate; and (c) finally computing the exchange rate misalignment as the difference between the actual exchange rate and the equilibrium value.

6. In line with the literature and empirical studies,<sup>3</sup> we assume that, in an oil producing country such as Algeria,<sup>4</sup> three factors are likely to be important in explaining the real effective exchange rate (REER).

- *The world price of oil:* Given that hydrocarbons account for a substantial fraction of Algeria’s export earnings, we use the real world price of oil (UK Brent price

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<sup>3</sup> See Spatafora and Stavrev (2003); Koranchelian (2005); and Zalduendo (2006).

<sup>4</sup> The hydrocarbon sector represented about half of GDP, nearly all exports of goods, and three quarter of fiscal revenues.

deflated by manufacturing unit value) as a proxy for external terms of trade.<sup>5</sup> Higher oil prices lead to higher wealth, which in turn would result in higher prices for nontradables and thus in an appreciation of the REER.

- *Differential productivity*: Lagging productivity with main trade partners would be associated with a depreciation of the REER, according to the Balassa-Samuelson effect.
- *Government expenditure*: Higher government spending creates pressures on domestic demand, which would result in an appreciation of the REER.

7. The estimated Vector Error Correction (VEC) model can be represented by:

$$REER_t = f(PROD_t, Oil_t, G_t)$$

Where REER represents the real effective exchange rate; PROD, the differential productivity defined as the difference between output per worker in Algeria and its main trading partners; Oil, oil price in real terms; and G, noninterest government expenditure as a share of GDP. All variables are in logarithms.

8. The estimation uses annual data series covering the period 1970–2006. All variables are nonstationary in levels but stationary in first differences and there is evidence of one cointegrating relationship between the REER and its determinants (see Appendix II.1). The cointegration relationship, normalized on the real effective exchange rate, is:

$$REER = 3.1 + 0.26Oil + 1.56PROD + 0.43G$$

(5.22)    (28.53)    (2.63)

9. The results suggest the following.

- The REER appreciates as oil prices increase. For example, a 1 percent increase in real oil prices will appreciate the REER by about 0.3 percent, well within the range typically reported in other studies (Spatafora and Stavrev, 2003; Koranchelian, 2005).
- The parameter associated with the differential productivity suggests, as expected, that lower domestic productivity leads to a depreciation of the REER. A 1 percent worsening in Algeria's productivity differential has more than a one-to-one depreciating effect on the REER. Again, the level of the coefficient is within the

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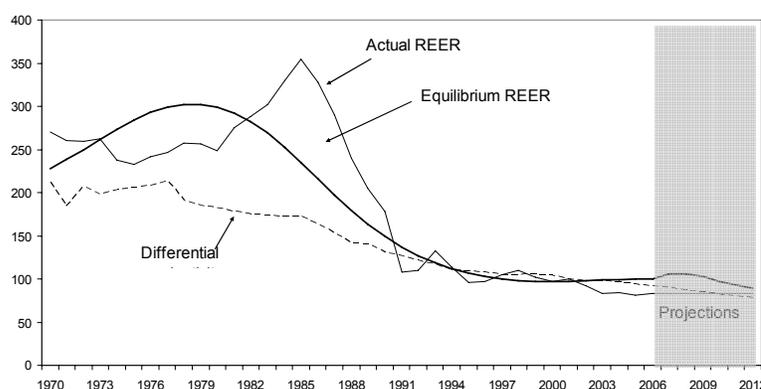
<sup>5</sup> The national hydrocarbon company (Sonatrach) fully surrenders foreign currency receipts generated by hydrocarbon exports to Bank of Algeria. In this context, oil prices are strongly related to other usual determinants of exchange rate such as net foreign assets.

range typically reported for many oil-producing and transition countries (Loko and Tuladhar, 2005; Zalduendo, 2006).

- An increase in government capital expenditure is associated with an appreciation of the REER. A 10 percent increase in government spending to GDP ratio will appreciate the REER by 1 percent.

10. Consistent with the CGER, we use the estimated coefficient and the projected medium-term values of the fundamentals for 2012 (WEO database) to compute the equilibrium REER (EREER).<sup>6</sup> After appreciating in 2007 and 2008 because of increasing world hydrocarbon prices, the estimated EREER will decline to 88.8, while the actual REER is 82.8, implying a relatively small gap of about 7 percent at end-December 2006, well within the range of error of this type of exercise.<sup>7</sup> These results suggest that the real effective exchange rate is broadly in line with its fundamentals. The depreciating trend of the real exchange rate is an equilibrium phenomenon, linked to the steady decline in productivity in Algeria.

Figure II.2. Real Exchange Rates, 1970–2006  
(2001=100)



Source: Fund staff estimates and projections.

### C. Macroeconomic Balance Approach

11. The first step in applying the macroeconomic balance approach is to estimate an equilibrium relationship between the current account balance and a set of macroeconomic

<sup>6</sup> Nominal oil price is projected to increase to \$80.2 per barrel in 2012 from \$64.3 in 2006 (WEO, November 2007). During the same period, high productivity in trading partners such as China, Russia, and Ukraine will increase the differential productivity, while government spending to GDP will increase to 33 percent from 28.5 percent in 2006.

<sup>7</sup> The forecast standard error of REER found in CGER is about 12 percent, which is reduced to 7–8 percent if one accounts for factors driving the REER in the short run through an error-correction specification.

fundamentals. The second step consists of using the coefficients and the medium-term values of the fundamentals (WEO projections for 2012) to compute the current account norm. The third step is to calculate the real exchange rate adjustment needed, other things being equal, to close the gap between the estimated and the underlying current account balance, that is, the current account balance that would emerge at a zero output gap both domestically and in partner countries.

12. Using panel econometric techniques and a sample of 13 oil/gas exporting countries located in the Middle East and Central Asia, including Algeria, Arezki (2007) estimated the equilibrium relationship between the current account balance and a set of fundamentals.<sup>8</sup> The estimated model can be represented by:

$$CA = f(FB, Pop, INFA, OilB, y)$$

Where CA is the current account as a share of Gross Domestic Product (GDP); FB represents the fiscal balance as a share of GDP; Pop, population growth; INFA, lagged Net Foreign Assets (NFA) as a share of GDP; OilB, the oil balance as a share of GDP; and y denotes real per capita GDP growth.

13. The results suggest the following: (a) a higher fiscal surplus improves the current account balance. An increase in the government budget balance by 1 percent of GDP leads to an increase in the current account balance by around 0.8 percent of GDP; (b) an increase in NFA raises the medium-term current account balance. An increase in NFA of 10 percent of GDP improves the medium-term current account balance by about 1/5 percent of GDP; (c) an increase in oil balance improves the current account balance; and (d) the coefficients associated with output and population growth are not significant.

14. The CA norm is calculated by applying the estimated coefficients to the medium-term values of the fundamentals (WEO 2012). The current account surplus for Algeria is projected to gradually decline to 10.4 percent of GDP in 2012 from about 25 percent in 2006. In this scenario, oil prices are estimated to remain relatively high. Imports would increase significantly, driven by the large investments of the government<sup>9</sup> and the state owned hydrocarbon company (Sonatrach).

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<sup>8</sup> CGER (2006) investigated the major determinants of the current account using a panel of 54 advanced and emerging countries, including Algeria. However, the sample does not include other major oil/gas exporting countries.

<sup>9</sup> In 2004, the authorities launched the Growth Consolidation Plan, a multi-year public investment program (2005–09) that amounted to \$50 billion (about 40 percent of 2007 GDP). The program has been revised upward several times to reach about \$155 billion (120 percent of 2007 GDP).

Table II.1. Current Account Regressions 1/

	Pooled (1)	Fixed effects (2)
Fiscal balance	0.800 (13.86)**	0.739 (12.78)**
Population growth	0.255 (0.97)	-0.009 (0.04)
NFA(-1)	0.018 (3.55)**	
Oil balance	0.153 (4.13)**	0.330 (6.68)**
Output growth	-0.104 (1.65)	-0.020 (0.33)
R-squared	0.75	0.71
Number of countries	13	13
Observations	298	298

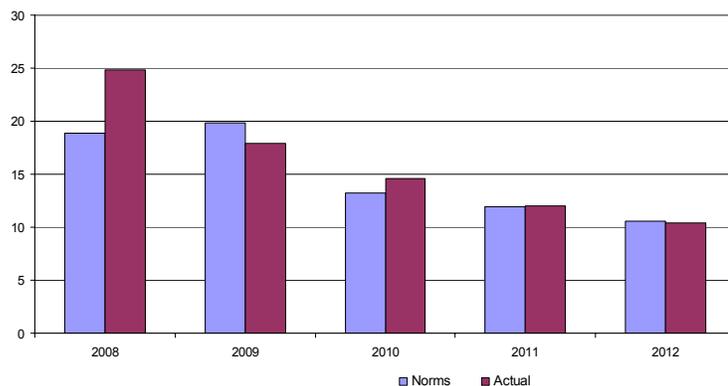
1/ Time dummies are included in the various specifications but estimates are not shown. Observations with excessively high leverage have been dropped from the sample. Robust t statistics in parentheses.

Table II.2. Medium-term Projections

	2006	2007	2008	2009	2010	2011	2012
Oil prices (US\$ per barrel)	65.7	74.7	90.5	83.8	81.0	80.5	80.3
Exports G&S (percent of GDP)	49.9	47.8	51.2	47.6	44.9	43.0	41.3
Imports G&S (percent of GDP)	22.2	24.6	26.5	31.0	32.7	33.6	33.6
CA surplus (percent of GDP)	25.2	23.6	24.8	17.9	14.6	12.0	10.4
Real GDP growth	2.0	4.6	4.9	4.9	5.1	5.1	5.1
Hydrocarbon	-2.5	-1.0	1.1	1.6	2.0	2.1	2.1
Nonhydrocarbon	5.6	6.0	6.5	6.4	6.3	6.2	6.2

15. The results show that the projected current account surplus for Algeria in 2012 (10.4 percent of GDP) is slightly below the estimated CA norm (10.6 percent of GDP<sup>10</sup>), implying that Algeria's REER is in line with the underlying current account position.

Figure II.3. Macroeconomic Balance Approach: Norms and Actual Current Account in Percent of GDP: 2008–12



Source: Fund staff estimates and projections.

#### D. Permanent Income Framework

16. The accounting identity links a country's current account balance (CA) to the excess of domestic saving (S) over domestic investment (I):

$$CA = S - I \quad (1)$$

17. Differentiating between the public and the private sectors, we can rewrite equation 1 as follows:

$$CA = (S_g - I_g) + (S_p - I_p) \quad (2)$$

Where g denotes the government and p denotes the nongovernment sector.<sup>11</sup>

18. The saving investment gap for the government is the fiscal balance (FB). Therefore, we can rewrite the CA as follows:

$$CA = FB + (S_p - I_p) \quad (3)$$

<sup>10</sup> This is in line with CGER results for Algeria.

<sup>11</sup> Sonatrach, state-owned hydrocarbon company, is a major component of the nongovernment sector. On average one-third of hydrocarbon export revenues accrue to Sonatrach and two-thirds accrue to the government.

19. The fiscal balance is defined as the difference between hydrocarbon revenue (HR) and the nonhydrocarbon fiscal balance (NHFB)—difference between nonhydrocarbon revenue and total expenditure.

$$FB = HR + NHFB \quad (4)$$

Combining equations 3 and 4 yields:

$$CA = HR + NHFB + (S_p - I_p) \quad (5)$$

20. We assume that the current account norm should be consistent with fiscal sustainability. There are several methods<sup>12</sup> to calculate the sustainable fiscal balance in a natural resource-rich economy such as Algeria. In line with the work previously done on Algeria<sup>13</sup> and other resource rich countries, we use the Permanent Income Framework (PIF). The hypothesis is forward looking as it assumes that government should save part of its current income for future generations.<sup>14</sup> Under the PIF, hydrocarbon revenue is split between the part that should be saved,  $S^{PIF}$ , and the part that can be consumed,  $R^{PIF}$  (which is equal to the nonhydrocarbon fiscal balance).

$$HR = R^{PIF} + S^{PIF} \quad (6)$$

$$R^{PIF} + NHFB = 0 \quad (7)$$

21. Combining equations 5, 6, and 7, the current account norm ( $CA^n$ ) consistent with the PIF sustainable fiscal balance is the sum of the implied saving under the PIF and the saving-investment balance of the nongovernment sector.

$$CA^n = S^{PIF} + (S_p - I_p) \quad (8)$$

22. We compute  $CA^n$ , under the PIF<sup>15</sup> using two different arbitrary rules: (a) keeping constant total real government wealth (rule 1); and (b) total real government wealth constant in per capita terms (rule 2). The second rule implies a larger saving (CA norm) than the first one because it takes into account population growth. We also assume that, in the medium term, nongovernment saving is equal to nongovernment investment ( $S_p - I_p = 0$ ).

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<sup>12</sup> For more details, see Jeffrey, Ossowski, and Fedelino (2003).

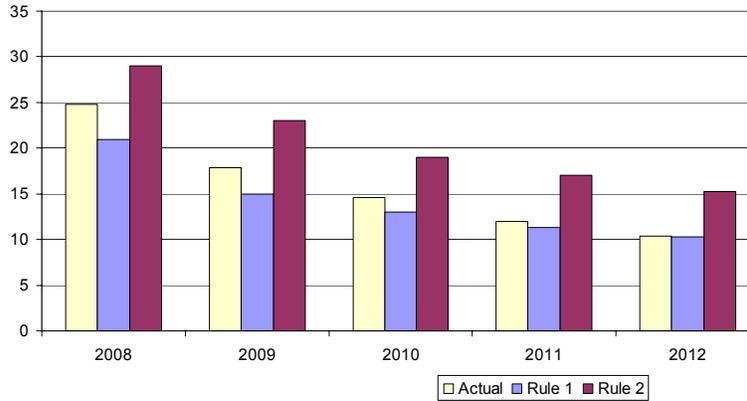
<sup>13</sup> See Floerkemeier (2004).

<sup>14</sup> For more details, see Davoodi (2002) and Floerkemeier (2004).

<sup>15</sup> The PIF requires assumptions about future hydrocarbon production and exports, and interest/discount rates.

The estimated current account norm is 10.3 percent of GDP (under rule 1), slightly below the projected current surplus at end-2012 (10.4 percent of GDP). Under the second rule, the current account norm (15.3 percent of GDP) is well above the projected current account surplus. These results suggest that Algeria's real exchange rate is not undervalued.

Figure II. 4. Permanent Income Framework Norms and Actual Current Account in Percent of GDP; 2008–12



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## Appendix II.1. Econometric Results

### Unit-Root Tests 1/

	ADF	ADF (with trend)	PP	PP (with trend)
<b>Level</b>				
REER	-0.175	-2.325	-0.369	-1.765
OIL	-2.272	-2.248	-2.274	-2.248
PROD	-0.262	-2.158	-0.179	-2.080
G	-3.005	-3.012	-2.429	-2.333
<b>First Difference</b>				
REER	-4.439*	-4.428*	-4.424*	-4.464*
OIL	-6.106*	-6.030*	-6.106*	-6.030*
PROD	-8.428*	-8.608*	-7.750*	-7.854*
G	-4.954*	-4.876*	-7.847*	-7.565*

1/ REER, OIL, PROD, and G stand for the log of real effective exchange rate, real price of oil, and productivity differential between Algeria and its main partners. The lag length is determined mechanically based on Schwarz information criterion (SIC) \*Significant at 1 percent.

### Cointegration tests

To correct for a possible small sample bias, we use Reinsel and Ahn's approach, which suggests that the critical value be adjusted upward by a multiplicative scaling factor,  $T/(T-nj)$ , with  $T$  the sample size,  $n$  the number of variables, and  $j$  the number of lags. After correcting the critical values, both Trace and Max-Eigen statistics reject the null hypothesis of zero cointegrating equation. Both tests indicate the presence of one cointegrating vector.

Table 2a. Trace Statistics for Cointegrating Rank

	Eingevalue	Trace Statistics	Critical Value	Critical value adjusted
r=0	0.86	117.04*	47.85	95.70
R≤1	0.73	54.62	29.79	59.58
R≤2	0.33	13.06	15.49	30.98
R≤3	0.00	0.02	3.84	7.68

\*Significant at 5 percent; r= cointegrating rank

Table 2b. Max-Eigen Statistics for Cointegrating Rank

	Eingevalue	Max-Eigen statistics	Critical Value	Critical value adjusted
r=0	0.86	62.42*	27.58	55.16
r≤1	0.73	41.55*	21.13	42.26
r≤2	0.33	13.04	14.26	28.52
r≤3	0.00	0.02	3.84	7.68

\*Significant at 5 percent; r= cointegrating rank