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Labor Market Policies and Unemployment in Morocco

A Quantitative Analysis

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Abstract

Agénor and El Aynaoui study the impact of labor market policies on unemployment in Morocco. They begin by reviewing the main features of the labor market. Then they present a quantitative framework that captures many of these features—such as a large public sector, high redundancy payments, powerful trade unions, and international labor mi[illegible]tion. The authors simulate the impact of a cut in the minimum wage and a reduction in payroll taxation. The results indicate that these policies may have a significant impact in the short term on open unskilled unemployment. But they also show that labor market reforms, to be effective in the long run, may need to be accompanied by offsetting changes in the budget to avoid crowding-out effects on private investment.

This paper—a joint product of the Poverty Reduction and Economic Management Division, World Bank Institute and Poverty Reduction and Economic Management 2, Africa Technical Families—is part of a larger effort in the Bank to understand the impact of labor market reforms on growth and unemployment. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Maria Gosiengfiao, room J4-280, telephone 202-473-3363, fax 202-676-9810, email address mgosiengfiao@worldbank.org. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at pagenor@worldbank.org or kelaynaoui@worldbank.org. July 2003. (82 pages)

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Labor Market Policies and Unemployment in Morocco: A Quantitative Analysis

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1 Introduction

The Moroccan economy grew at a yearly average rate of 3.5 percent during the period 1983-92 and 3.1 percent during 1993-2001, despite a high degree of output volatility (particularly in the agricultural sector). However, rapid population growth limited income gains in per capita terms to yearly averages of only 1.4 percent during the 1980s and to negligible rates during the 1990s. Moreover, the sharp increase in the labor force induced by greater participation rates (at about 2.5 percent per annum during the past two decades), combined with low output growth rates, led to high rates of unemployment in urban areas and underemployment in the rural sector (see Figure 1).

Concerns over the insufficient pace of job creation has led many observers to recommend the implementation of a series of structural reforms aimed at accelerating the rate of economic growth. Of particular interest in this context has been the potential impact of various kinds of labor market reforms on employment and resource allocation. The purpose of this paper is to develop a quantitative macroeconomic framework that can be used to analyze the impact of various types of labor market reforms on employment, wages, and economic growth in Morocco. Our point of departure is that a key condition for the design of growth-enhancing policies is a proper understanding of the functioning of the labor market, particularly in the urban sector. Indeed, it has long been recognized that the labor market is a key determinant of individual welfare in developing countries. It has a direct influence on household resources, because the poor derive the majority of their monetary income from selling their work force. In addition, the labor market is an important channel in the transmission process of exogenous shocks and adjustment policies—both macroeconomic and structural—on economic activity, employment, relative prices, and resource allocation. For instance, labor market segmentation plays a key role in shaping the effects of labor market reforms on resource allocation. Indeed, in the presence of a low degree of worker mobility, a segmented labor market contributes to persistent wage differentials that may hinder the resource allocation indispensable to cope with external and policy-induced shocks. In addition to labor market segmentation and imperfect labor mobility, it is important to account for the heterogeneity of the labor force and the specific nature of wage formation within sectors. These considerations apply most significantly to the urban labor market, given that the rural labor market in developing countries functions more like a competitive market.

The remainder of the paper is organized as follows. Section II provides an overview of the Moroccan labor market. It also explains the main constraints affecting the labor market, and identifies some of the challenges that Morocco will continue to face in the coming years. Section III presents a quantitative framework to analyze the effects of various labor market reforms on growth, employment, and wages. The framework developed in this paper is based on the IMMPA model developed by Agénor, Izquierdo, and Fofack (2003), and Agénor, Fernandes, Haddad, and van der Mensbrugghe (2003).[1] However, the version developed here differs in several important ways from those described in these other papers, in order to reflect the country's institutional specificities and the type of policy issues that we want to address. First, we allow for open unskilled urban unemployment, by introducing a Harris-Todaro type mechanism to determine the supply of unskilled labor in the formal sector. This extension is very important for Morocco, where unskilled unemployment accounts for a large fraction of total open unemployment. Second, we use a monopoly union approach to determine skilled workers' wage in the private formal sector that accounts for the effect of firing costs, open unemployment, and a signaling role of public sector wages on the union's target wage. This setup leads to a wage equation in which there is a *level* effect of unemployment on wages, as predicted by various forms of efficiency wage theories (such as those emphasizing the wage-productivity link or turnover costs, a bargaining framework between firms and a centralized trade union, or a negative effect of unemployment on workers' reservation wage). Third, we assume that nominal wages are fully flexible in both the traded and nontraded agricultural sector and adjust continuously to equilibrate the supply and demand for labor in the rural labor market. Fourth, wages in the public sector are treated as exogenous and we assume that there exists a non-pecuniary benefit (in terms of, say, increased job security) that leads to zero turnover for that category of workers—even in the presence of higher wages for that category of labor in the private sector. Fifth, in order to analyze the impact of changes in the taxation of firms' wage bill on employment, we introduce payroll taxation on the use of both skilled and unskilled labor in the private urban formal sector. The extent to which high

[1] Various computable general equilibrium (CGE) models have been built for Morocco in the recent past; these include Cogneau and Tapinos (1995), Lofgren (1999), and Rutherford, Rustrom, and Tarr (1994). None of these models, however, addresses the set of issues discussed in this paper.

payroll taxes have tended to discourage the demand for labor (particularly unskilled labor) has been an important policy issue in Morocco. Our framework allows us to consider the general implications of changes in these taxes, and the various channels through which they affect employment, as well as possible complementarities between labor market policies and tax reform. Finally, we account for congestion effects associated with the use of public sector capital in the urban sector.

Section IV presents simulation experiments focusing on a cut in the minimum wage and a reduction in payroll taxation on unskilled labor. In both cases, we focus on the behavior of wages across sectors, the demand for labor, and unemployment. Section V summarizes the main results of the analysis. We highlight, in particular, the need to extend the set of policy simulations to consider the impact of various "closure rules" for the government budget (that is, offsetting changes in taxes), reductions in firing costs, public sector layoffs (possibly coupled with an increase in employment subsidies to private, formal sector firms), changes in bargaining strength between unions and employers, and the effects of changes in the composition of public expenditure (that is, the allocation between investment in infrastructure, education, and health) on growth and employment.

2 The Labor Market in Morocco

This section presents an overview of the labor market in Morocco. First, we present its basic structural features and the degree of segmentation, with a focus on the role of the informal sector. Second, we examine the overall composition of the labor force (including public employment), the structure of unemployment, and the returns to education. Third, we review regulatory and institutional characteristics of the labor market, including minimum wage legislation, hiring and firing restrictions, nonwage labor costs, and the role of trade unions. Fourth, we examine some of the evidence on wage flexibility. Fifth, we discuss factors affecting domestic and international labor migration. Finally, we highlight some of the constraints and challenges that the labor market poses to policymakers in Morocco.

2.1 Basic Structure

The urban labor market in developing economies is generally well described as consisting of two sectors, a formal and an informal one, with distinct functioning modes. The segmentation hypothesis has important implications for the functioning of the labor market. For instance, high pay formal sector jobs are often rationed and, despite an excess supply of labor in the low pay informal sector, wages do not adjust. Note that many studies have also suggested that the two segments are highly heterogeneous—in the nature of occupations, in the production mode, in the sources of income, and so on. The view that the informal sector is competitive has received mixed support from the empirical evidence. In fact, in some countries many activities classified in the informal sector present barriers to entry. For instance, access can be conditioned by customs practices and relatively strict unwritten rules. This appears to be the case for many crafting activities in Morocco.

Despite the lack of comprehensive micro-level data on enterprises at the national level, the common view of Morocco's urban labor market is that of a dual segmented market. Within this framework, there have been attempts to measure the respective size of the two segments. For instance, the civil servants (central government and local governments), workers in public enterprises and those covered by the social security scheme (CNSS) constitute the formal sector. The informal sector corresponds then to the residual.[2] Other studies have shown that the Moroccan urban labor market is highly segmented, and that its functioning is far from competitive.[3] Non-compensating wage differentials between workers with similar productive endowments are pervasive: higher gains are frequently observed when workers (even unskilled ones) are located in particular segments. In fact, despite the existence of excess labor supply, wages in the formal sector do not adjust, and the informal sector is not absorbing all the job seekers. Within this context of restricted labor mobility and specific participation dynamics, the sector of occupation is a key determinant of an individual's remuneration and standard of living. Moreover, surveys show that private firms are willing to pay a premium—as suggested by efficiency wage theories—to secure workers' commitment.

[2]See, for instance, Belghazi (1998) and Touhami (2003).

[3]Empirical tests by El Aynaoui (1998) confirm the prevalence of the segmentation hypothesis.

2.2 Employment, Unemployment, and the Returns to Education

The first part of our review of the characteristics of the labor market in Morocco focuses on the sectoral distribution of the workforce, the structure of public employment, the composition of unemployment, and the returns to education.

2.2.1 Sectoral distribution of the workforce

In Morocco, a sizable share of the workforce (around 55 percent in 2000) remains employed in the agricultural sector. This proportion is quite high compared to around 35 percent for lower middle-income countries. At the same time, women still account for only 22 percent of the total urban workforce. Data on the occupational distribution of the workforce in urban areas show that wage employment is dominant, followed by self-employment. Panel 6 in Figure 3 displays the distribution of the workforce by occupational status for 2000. It shows that wage earners accounted for about 61 percent of total employment, and self employment for about 24 percent. Most of the wage earners are employed in the private urban sector, though public sector employment (central government, local communities, public enterprises) also accounts for a large proportion (around 19.5 percent). The rest of the workers are non remunerated aid-families, apprentices, employers or home workers. The average educational level of the work force is rather low, with 55 percent not holding any degree in 2000.

The evidence for developing countries in general suggests that contractions of available opportunities in salaried occupations tend to drive workers toward self employment. In Morocco, the data seem also to suggest that the share of self employment in total urban employment tends to rise when wage employment decreases. However, during the 1990s (a decade marked by a weak growth performance, as noted earlier), self employment did not significantly increase, remaining at around 24 percent of total employment. Although some observers have argued that the urban labor market in Morocco has undergone a process of "informalization", this argument is debatable. If we simply define "informalization" as a reduction in the share of wage employment in total employment, it is not obvious that there has been a growing informalization of the urban labor market. Indeed, even if there are marked fluctuations on a yearly basis, wage employment is by far the major

type of occupation in Morocco. Its share has not dramatically decreased over the 1990s. The lowest value is 59.3 percent of the total workforce in 1993 (see Panel 5, Figure 3).

2.2.2 Public sector employment

The public sector (central government, municipalities, and public enterprises) plays an important role in Morocco. It represented around 18 percent of Morocco's GDP in 2000. With about 635,000 employees (central government excluding the military, and employees of municipalities), equivalent to 15 percent of total urban employment—or 19.5 percent if we add public enterprises. As a result, wage policy in the public sector has important consequences on the functioning of the labor market. A recent study by the World Bank (2002) found that monetary compensation are 8 percent higher in the public sector than in the private sector. If we were to include non-pecuniary compensation, such as job security, a generous pensions fund, and a higher shirking rate, then the divergence between private and public sector wages would be even larger. Using the living standard measurement survey for 1998-99 to assess the value of such non-pecuniary compensation suggests that these features are on average equivalent to 60-100 percent of the monetary remuneration. This implies that for a corresponding nominal remuneration, a civil servant will get a global wage between 1.5 and two times higher than what he would obtain in the private sector. This outcome may explain the significant queues for employment in the public sector, particularly by skilled workers.

2.2.3 Unemployment

As in many developing countries, in Morocco open unemployment is essentially an urban phenomenon (see Panels 4 and 5, Figure 2). In 2000, the urban unemployment rate stood at 21.4 percent, against 15.8 percent in 1990. This is equivalent, in 2000, to 1.1 million unemployed out of an active population of 5.4 million. Several facts reveal important tensions on the domestic labor market. The youth (15-24 years old) are particularly vulnerable to unemployment in urban areas, with a rate often well above 30 percent since the early 1990s (see Panel 4, Figure 3). Whereas the unemployment rate for individuals with no instruction is somewhat low (12.2 percent in 2000) and fluctuates significantly in conjunction with economic activity, the unemployment rate is persistently high for individuals with a higher level of

education. In 2000, their unemployment rate was 30.7 percent. Gender differences are also quite striking: in 2000, 26.7 percent of active urban women were unemployed, compared to only 19.9 percent of the men.

Turning now to the composition of unemployment, the data reveal that the 15-24 year old group and individuals with a higher level of education account for around 37 percent and more than 18 percent of the number of job seekers, respectively, in 2000. Individuals with no education represented 8 percent of the unemployed population that year. Underemployment is pervasive, indicating that unemployment may well be worse than the data suggest: in 1991, it affected 20 percent of the urban workforce, and, for the under-25 group, the rate of underemployment was 34.5 percent. In 1995, this rate was 24.2 percent and 23.3 percent for the 15-24 and the 25-34 year old groups, respectively. Overall, movements in the unemployment rate are highly correlated with fluctuations in GDP. For instance, in 1995, a year marked by a severe drought, urban unemployment reached 22.9 percent, and the strong subsequent recovery in 1996, in which GDP grew by 12 percent, allowed to reduce it by about 5 percentage points.

Additional elements reveal several features of urban unemployment in Morocco. As in many developing countries, the majority (about 54.5 percent) of the unemployed are first-time job seekers. Among the unemployed, the impact of long-term unemployment is pervasive: in 2000, around 75 percent of job seekers were searching for a job for more than 12 months. Moreover, the educational level does not appear to reduce significantly the probability of staying unemployed. Indeed, if we only consider individuals with a higher level of education, around 85 percent had been searching for a job for over a year. More generally, in 2000, the average duration of unemployment was 41 months.

An analysis of the job search patterns of the unemployed reveals specific characteristics. A great majority of the unemployed (about two-thirds) searches through personal contacts. A targeted study on cohorts of students from vocational institutes also found that personal relations play a crucial role in finding a job in the private sector (see Montmarquette et al. (1996)). Only 9 percent of the unemployed are using formal strategies (such as written inquiries or responses to job openings). Hence, personal relations appears to be the most efficient way to find a job in Morocco. Within a context of tight hiring and firing regulations (as discussed below), the reliance on personal relations may also be a way for the employers to minimize, through maximum information on the candidate, the risks associated with hiring.

What type of jobs are the unemployed favoring? According to available surveys, more than 80 percent of the unemployed are searching for a salaried occupation. In fact, only a marginal portion of them is willing to start an independent activity. Skilled workers usually prefer to remain unemployed rather than accept a job in the informal sector (mostly due to the impact of the family environment on luxury unemployment) or go into self-employment. Thus, the fact that around 36 percent of the urban poor job seekers are ready to accept any occupation, against less than 15 percent of their non-poor counterparts, is a sign of their vulnerability.

In urban areas, the rate of unemployment for the poor is about 50 percent higher than the overall rate of unemployment. Overall, the insertion on the labor market is a key determinant of the living standards. The dependency ratio—calculated as the ratio of the unemployed to the employed members of a household—is 50 percent higher for poor families. Along the same line, econometric estimates indicate that, ceteris paribus, unemployment significantly increases the probability of being poor (see El Aynaoui (1998)). The link between labor market functioning and poverty is a strong argument in favor of labor market reform to address segmentation and unemployment.

2.2.4 Returns on Education

Globally, the few available studies assessing the impact of educational attainments on earnings are showing the usual positive influence. Experience also shapes the educational returns—there is a quadratic effect. Estimations of earning functions for wage earners at the national and regional levels indicate that private marginal returns of investment in education is around 10 percent per each additional year of education (see Touhami (2003), and Cherkaoui et al. (2002)). Returns of education are higher for females and in urban areas. However, the returns of educational achievements are rather different when controlling for the segmentation hypothesis (El Aynaoui (1998)). In fact, an actual effect is only observed in the formal sector while the private returns of education are not significant in the informal sector. This outcome might preclude investment incentives in human capital, specifically within particular categories of individual who, as evoked earlier, may not have access to the formal sector.

2.3 Regulatory and Institutional Features

Regulatory and institutional features of the labor market in Morocco that are important for understanding wage and employment formation include the minimum wage, hiring and firing regulations, the matching process between supply and demand for labor, the structure of nonwage labor costs, and the role of trade unions.

2.3.1 Minimum Wage Regulation

Morocco adopted as early as 1936 a minimum wage legislation that sets different wages floors for urban and rural labor markets, and for different age categories. Minimum wages are revised according to a formal price indexation mechanism, namely as soon as the consumer price index increases by 5 percent. In practice, however, revisions are irregular and rather independent of the indexation rule. In fact, they are usually the outcome of political and discretionary decisions, following overwhelming pressure from the trade unions. The few available studies reveal that the urban minimum wage regulation (which concerns mostly unskilled workers) is pretty well enforced in the private formal sector, through an active role of the administration and the trade unions. According to Benhayoun et al. (2001), only 13 percent of the wage earners in the private formal sector are unfairly paid a salary lower than the minimum wage.

During the period 1970-2000, the nominal urban minimum wage has increased by an average of 6 percent a year (see Panels 1 and 4, Figure 2). In real terms, the urban minimum wage fluctuates, though slightly, due to the ad hoc nature of the revision process. Over the period 1970-2000, the real urban minimum wage rose on average by around 1.1 percent every year. Over the 1990s only, it has increased by around 1.3 percent, a rate faster than the rate of growth of labor productivity in the industrial formal private sector. These increases adversely affected the demand for unskilled labor, and contributed to a rise in Morocco's unit labor costs, thereby affecting Morocco's external competitiveness.

The urban minimum wage represents 50 percent of the average wage in the formal private sector and 178 percent of GDP per capita in 2000—a fairly high level in comparison to other developing countries. Benhayoun and alii (2001) have found that minimum wage legislation influences, though weakly, the overall wage structure in the private formal sector. Their study also

found that increases in the minimum wage tend to reduce wage inequality in the short term, but that this effect is rather limited in the long term due to a diffusion effect to the whole wage structure. Other estimates at the firm level in the formal private sector (Mouime (2001)) have found that an increase in the minimum wage raises the average wage over time. More specifically, the short and long-term elasticities are lower than one and superior to one, respectively. Azam (1995) failed to demonstrate empirically that the urban minimum wage has a direct effect on the level of employment, but concluded that it affects the level of employment via the wedge between the minimum wage and the average wage paid in the private formal sector. Benhayoun et al. (2001) also found that the urban minimum wage has a tendency to deter job creation in the formal sector. Here, a major source of concern for policymakers is to assess whether the minimum wage deters formal job creation (particularly for low-skilled workers) by introducing downward rigidity in real wages. As discussed below, this is an important issue in assessing the impact of labor market reforms in Morocco.

2.3.2 Hiring and Firing Regulations

Morocco has comprehensive and rather restrictive labor market regulations, particularly regarding firing procedures for the private sector workforce. There regulations are well enforced, through an active role of the administration and the trade unions. For instance, individual layoffs for economic purposes are prohibited. Moreover, downsizing for economic reasons is subject to prior approval by the regional authorities. The only way for an employer to dismiss a worker is for disciplinary matters. Even then, the law opens the possibility for a dismissed worker to lodge an appeal before the court which will examine the employer decision. The procedure is so complicated that firms seek to avoid it through often costly direct agreements with the laid off worker, not to face long judicial procedures. In fact, more than in its rigidity, the main flaw of the current legal framework resides in the unpredictability and inconsistency of the jurisprudence over time and across space that stem from the important leeway the law grants to the courts.

This constraining labor market framework hinders labor demand. The judicial practice further strengthens permanent workers' job security, giving insiders a substantial bargaining power, and leaving outsiders clearly disadvantaged. Also, the difficulties involved in firing workers, and the potential financial cost that firing can imply, partly explain why employers are usu-

ally reluctant to hire new workers and why they rely mainly on personal relationships to do so, as shown by some available studies (CNJA (1995), Montmarquette et al. (1996)) and as noted earlier. Through personal contacts, employers minimize the risk related to hiring by gathering complete information on the worker. Knowing the candidate also increases the likelihood that they will be able to exercise social pressures to negotiate better terms for his/hers eventual firing. Globally, nonetheless, this legal framework constrains the capacity of enterprises to adapt to changes in economic activity and relative price incentives, and encourages temporary contracts. The very nature of these contracts prevents significant gains in productivity, because they dissuade firms from investing in the human capital of their workforce.

2.3.3 Institutional Job Matching Processes

Formally, the job matching process is a public monopoly. The country has recently adopted a set of active labor market policies aimed at improving the job matching process for young skilled workers. This policy is mainly based on regional public institutions in charge of improving the matching process between labor demand and young skilled labor supply, and specific labor tax deductions favoring their employment. A study by Ibourk and Perelman (1999) shows that these institutions tend to improve the efficiency of the job matching process, but that they are limited in their action by the gap between labor demand and labor supply.

2.3.4 Nonwage Labor Costs

In addition to minimum wage regulation and firing legislation, there are numerous compulsory social contributions that also affect the private labor demand function. In the private formal industrial sector, besides income taxes,[4] nonwage labor costs represent around 24 percent of the total costs of the labor force. Hence, for a worker in the private formal sector, there is a substantial wedge between the gross wage and the net income. According to the current regulatory framework, employers pay around 18.6 percent of the gross wage to the Social Security (CNSS) for pension contributions and other social coverages. There is also a 1.6 percent compulsory tax on the

[4]Income tax rates range from 13 percent to 44 percent. Social contributions are deductible from the tax base.

overall wage bill of every enterprise, exclusively to contribute to the budget of the public vocational training system. Besides, the employer is responsible for the security of his workers—labor accident and professional illness—and has to subscribe to a specific insurance to cover these risks. The cost ranges between 1 and 3 percent of the worker's total wage. In addition, the formal private sector often provides medical coverage to its labor force, because it is not supplied by the Social Security scheme. The cost of such private health care schemes ranges from 2 to 4 percent of the total wage. Finally, the compulsory retirement plan provided by the Social Security has led many firms to subscribe to additional pension plans for their work force. In general, the cost of these complementary plans is around 12 percent of the wage. Usually, the costs of health care and retirement plans are shared on an equal basis by the employer and the worker.

It should be noted that the CNSS does not provide any unemployment compensation. As in most developing countries, no unemployment benefit scheme exists in Morocco. Replacing the coercive firing regulations and the expensive severance pay upon dismissal by an unemployment benefit scheme could be a way to improve the functioning of the urban labor market.

2.3.5 Trade Unions

Morocco has three trade unions with nationwide representations. They derive most of their power from their tight relationship with the political parties, an heritage of their intense involvement in the combat for independence. Trade unions are very active and their bargaining power is quite strong in the public sector and the private formal sector. In particular, they play an active role in enforcing the collective conventions existing in specific sectors (banking, transport), as well as the corpus of labor rules in the administration and in public enterprises. This collective action creates a dual situation where the workers in any of the unionized sectors are protected whereas those in other sectors are subject to market forces. Trade unions also contribute to the enforcement of the firing and minimum wage regulations, as noted earlier. In 2001, trade unions were able to negotiate a 10 percent increase in the minimum wage and a significant boost in remunerations in the public sector, despite low inflation and tight budget constraints. They have also for many years impeded the adoption of a new labor code, due to diverging views with private employers on the flexibility of labor contracts.

2.4 Wage Flexibility

Many of the institutional factors reviewed earlier (most importantly minimum wage regulation, firing regulations, and trade unions with strong bargaining power) may hinder real wage flexibility in Morocco. Comprehensive and accurate data on the evolution of real wages across sectors and skill categories over time are not available. Nevertheless, several sectoral surveys indicate that real wages are somewhat flexible in the urban labor market. For instance, between 1980 and 1987, data from the Social Security (CNSS) are showing that the real average wage in the private formal sector decreased by 10 percent. Using various statistical sources, Morrisson (1991) found that real wages in the industry and the public sector fell substantially between 1980 and 1986. Over the 1985-89 period, due to a rapid growth of temporary contracts with low remunerations, real wages fell by 2.5 percent per year in the manufacturing sector and led to rapid job creation. During the 1990s, real average wages increased in the public and formal private industrial sectors, by around 1.2 percent and 3.1 percent a year, respectively, driven by several revisions in the minimum wage and sweeping wage increases in the civil service.

In Morocco, nominal wages tend to be partially indexed to prices. According to the econometric calculations performed by Mouime (2001), the short-term elasticity of the average nominal wage to the consumer price index is 0.85 in the formal sector.[5] The author also found that in the industrial sector the wage-productivity link is explained by an efficiency wage relationship. Although this analysis is not differentiated by levels of skills (due to data limitations), one would expect the relationship to be particularly relevant for skilled workers, thus introducing a significant degree of downward wage rigidity for that category of labor in the formal private sector.

The evidence presented here does not imply that there is no *relative* wage rigidity across skill categories and/or sectors of employment. This is important because as discussed below, in the presence of labor market segmentation—an important feature of the Moroccan urban labor market—relative wage rigidity across segments and skill categories may explain the persistence of widespread unemployment.

[5]The Centre Marocain de Conjoncture (2001) obtains similar results for the industrial sector.

2.5 Domestic and International Labor Migration

2.5.1 Rural-Urban Migration

Significant rural-urban migration flows heightens the high pressures on the urban labor market. Available estimates indicate that, every year, around 200.000 migrants (in net terms) are entering urban areas, equivalent to around 40 percent of the change in the urban population. It however underlies important movements from and to cities, as well as international migrations. Among other factors, a low level of productivity and weak growth outcomes in the agriculture sector over the last decade is deemed to contribute to this dynamics. Overall, the rural population is roughly stable (in absolute numbers), whereas its natural growth rate around 2.6 percent. In fact, the urban population, expanding at around 3 percent a year, absorbs most of this expansion.

2.5.2 International Migration

Immigrants from Morocco represent an important share of the foreigners residing in the European Union. Due to adverse domestic economic conditions and numerous family and community links, migration flows continue to be important as shown in recent OECD data. Data are available only for selected countries and official flows, namely Belgium, France, and Netherlands, which are traditional destinations for Moroccan international migrants. Over the 1990-1999 period, around 222,000 persons have migrated to these countries, equivalent to around 25,000 on average every year (see Figure 4). Hence, with between 6 and 13 percent of the change in the total domestic labor force (see Figure 5), yearly outflows to the three selected countries somewhat relieved pressure on the domestic labor market. In addition, the large number of workers abroad translates into a large amount of remittances, which represent a large fraction of GDP and income (see Figure 6) and provide an important source of foreign exchange.

2.6 Constraints and Challenges

The main constraints operating on the labor market in Morocco, and by implication the challenges that policymakers would have to take up to substantially lessen unemployment, can be summarized as follows.

- *The population is still growing rapidly.* Between 1982 and 1994 (which corresponds to the latest census available), the Moroccan population grew by 2,03 percent on average per year ; compared to 2,6 percent during the 1971-82 period. This reduction is essentially imputable to a decrease in the fertility rate (3,28 child per female in 1994). Nevertheless, the population growth rates remains 40 percent higher than the average for middle-income countries. Hence, influenced by the joint effects resulting from the natural growth rate and the rural migration trends, the urban population expanded by 27.7 percent between 1982 and 1994. In 2001, 56 percent of the population is estimated to live in urban areas. In fact, the urbanization of the country is a long term tendency contributing to the labor force growth.

- *Labor supply is growing at a sustained rate.* Within this environment, and considering the demographic structure of the Moroccan population, one of the main challenge in the coming years will be the absorption by the urban labor market of a sustained flow of workers. The pressure is more intense when the situation in the agricultural sector, strongly linked to the climatic situation deteriorates : causing an acceleration in the rural migrations pace, years of weak production are therefore associated with a significant growth in the urban labor force. In the course of the last century, Morocco has experimented, on average, a year of dryness every three years. This confirms that, if it was needed, a sensitive reduction of labor market imbalances can only be outlined on a macroeconomic perspective (and also demographic measures).

- *The potential size of the labor force is significant.* Similarly, women constitute a considerable potential labor force. Indeed, if for specific reasons—education, social status, opportunity cost associated to domestic activities, and so on—their labor supply remains weak, their participation level should increase in the future. In addition, even in the hypothesis of a sustained economic growth, an improvement in the individual perception about the labor market conditions, could contribute to amplify the entry, particularly of women, into the market.

- *Human capital is weak.* The average quality, measured by educational attainments, of the Moroccan active population remains low compared to similar countries. The national illiteracy rate stands at 57.7 percent

(70 percent for women and 44 percent for men), whereas in urban areas 48.5 percent of the population is illiterate.

As a consequence, in the future, the active population will grow more rapidly than the overall population: during the 1996-2010 period, projections are showing that the population should increase by 1.6 percent on average per year, against a conservative estimate of 2.4 percent for the total (urban and rural) labor force. In addition, during the last decade, job creations concerned essentially temporary occupations with a low productivity, and self-employment activities. The trends in the urban work force requires such a significant number of job creations that, in the absence of sustained growth, the persistence of a substantial rate of urban unemployment is highly probable in the future.

Similarly, weaknesses in educational attainments are worrying, given the importance of the educational level for growth (as in the case of Southeast Asian countries). Recent studies on other countries have also shown this crucial role of human capital accumulation on growth: for instance, an analysis of the effects of various structural reform implemented in 19 countries in the Latin America region, over the 1985-95 period, reveals the key role of the educational level of the work force, which is one of the main determinant of productivity. Therefore, to boost productivity and achieve higher growth rates, educational level of the Moroccan work force should be raised significantly. Nevertheless, as suggested by a recent contribution, the positive influence of human capital accumulation on growth seems to be closely linked to the degree of external openness of a country ; an open economy stimulate a more efficient factor allocation positively affecting the returns of human capital.

A continued effort to improve human capital development is essential for trade driven growth. Indeed, within a context of growing capital mobility and technology diffusion, the quality of the human capital stock is a crucial determinant of comparative advantage. It should speed-up growth throughout a rise in productivity, and allow to attract more foreign direct investment. This is a key issue because, as a consequence of the progressive implementation by the European Union (EU) of the Uruguay Round agreement (it implies an erosion of the preferential access of Moroccan goods of the EU market), national firms will face increasing competition from low-wage countries on their essential export markets. Similarly, in the perspective of the free trade zone with the EU (by 2010), internal competition will rise.

In the short term, the structural factors evoked in this section jeopardize a substantial improvement of the situation. Indeed, considering the described demographic trends, the rural-urban migration flows, and the volatile nature of growth, it is highly probable that exacerbated tensions will persist on the urban labor market. It is therefore necessary to implement appropriate policy actions to cope with this situation.

3 A Quantitative Framework

We now present a quantitative framework to analyze the effects of various labor market reforms on growth, employment, and wages in Morocco. As noted earlier, our framework is based in part on the IMMPA model developed by Agénor, Izquierdo, and Fofack (2003), and Agénor, Fernandes, Haddad, and van der Mensbrugghe (2003), suitably modified to reflect the most salient structural characteristics of the labor market in Morocco. We review the various building blocks of the model, the structure of which is summarized in Figure 7. We consider in turn the production side, employment, the demand side, external trade, sectoral and aggregate prices, income formation, and the public sector. Throughout the discussion, we often use "generic" forms to specify functional relationships; explicit functional forms, as well as variable names and definitions, are provided in Appendices A and B.

3.1 Production

We begin with a distinction on the production side between rural and urban sectors. The rural economy is itself divided between a tradable sector, which consists of a homogeneous good sold abroad and on domestic markets, and a non-traded goods sector, which produces a (composite) good sold only domestically. Urban production includes both formal and informal components; in addition, the formal urban economy is separated between production of private goods (both traded and nontraded) and a public good.

3.1.1 Rural Production

Land available for each of rural activity is assumed to be in fixed supply and there is no market to trade property claims on it. Gross output of non-traded goods, X_{AN}, and exported agricultural goods, X_{AT}, are given by the sum of

value added (V_{AN} and V_{AT}, respectively) and intermediate consumption:

$$X_{AN} = V_{AN} + X_{AN} \sum_i a_{iAN}, \qquad \text{for } i = AN, AT, I, P, G \tag{1}$$

$$X_{AT} = V_{AT} + X_{AT} \sum_i a_{iAT}, \qquad \text{for } i = AN, AT, I, P, G \tag{2}$$

where the a_{ij} are conventionally-defined input-output coefficients (sales from sector i to sector j) and AN, AT, I, P, G are used in what follows to refer, respectively, to the nontraded agricultural sector, the traded agricultural sector, the informal sector, the private urban sector, and the public sector.

Value added in each sector is assumed to be produced with a Cobb-Douglas (CD) function of land, LAN, and a composite factor, defined as a constant elasticity of substitution (CES) function that depends on the number of unskilled rural workers employed (U_{AN} in the non-traded-good sector and U_{AT} in the traded-good sector) and the economy-wide stock of public physical capital (K_G, which is defined below):

$$V_{AN} = CD[LAN_{AN}, CES(U_{AN}, K_G)], \tag{3}$$

$$V_{AT} = CD[LAN_{AT}, CES(U_{AT}, K_G)]. \tag{4}$$

For simplicity, we normalize the area of land allocated to production to unity in what follows. Given the CD specification, agricultural production exhibits decreasing returns to scale in the remaining (composite) input. The nontraded agricultural good is exclusively produced for the domestic market,

$$X_{AN} = D_{AN}, \tag{5}$$

whereas production of the rural traded good is allocated to both domestic consumption and exports (see below).

3.1.2 Urban Informal Production

Gross production in the urban informal sector, X_I, is given as the sum of value added, V_I, and intermediate consumption:

$$X_I = V_I + X_I \sum_i a_{iI}, \qquad \text{for } i = AN, AT, I, P, G \tag{6}$$

Value added is given as a function of the number of unskilled workers employed in the informal economy, U_I, with decreasing returns to scale:

$$V_I = \alpha_{XI} U_I^{\beta_{XI}}, \qquad \alpha_{XI} > 0, \quad 0 < \beta_{XI} < 1. \tag{7}$$

From (7), the demand for labor in the informal sector can be derived as

$$U_I^d = \beta_{XI}(V_I/w_I), \tag{8}$$

where w_I is the product wage given by $w_I = W_I/PV_I$, with PV_I denoting the price of value added in the informal sector (defined below).

3.1.3 Production of public goods and services

Gross production of public goods and services (or public good, for short), X_G, is given by the sum of value added, V_G, and intermediate consumption:

$$X_G = V_G + X_G \sum_i a_{iG}, \qquad \text{for } i = AN, AT, I, P, G \tag{9}$$

Value added in the public sector is measured by the government wage bill:

$$V_G = (W_{UG} U_G + W_{SG} S_G)/PV_G. \tag{10}$$

Employment levels of both categories of workers are treated as exogenous.

3.1.4 Urban Formal Private Production

Private formal production uses as inputs both skilled and unskilled labor, as well as physical capital. Skilled labor and private physical capital have a higher degree of complementarity (lower degree of substitution) than physical capital and unskilled workers. In order to account explicitly for these differences in the degree of substitutability among inputs, we adopt a nested CES production structure. Specifically gross production of the private formal-urban sector, X_P, is taken to be given by the sum of value added, V_P, and intermediate consumption:

$$X_P = V_P + X_P \sum_i a_{iP}, \qquad \text{for } i = AN, AT, I, P, G, \tag{11}$$

where

$$V_P = CES\{CES[CES(S_P, K_P), U_P], \frac{K_G}{(U_U + S)^{dco_P}}\}, \tag{12}$$

where $dco_P \geq 0$. At the lowest level of equation (12), skilled labor, S_P, and private capital, K_P, are combined to form the composite input T_2, with a low elasticity of substitution between them. At the second level, this composite input is used together with unskilled labor, U_P, to form the composite input T_1. The elasticity of substitution between T_2 and unskilled workers, U_P, is higher than between S_P and K_P. The final layer combines T_1 and $K_G/(U_U + S)$, the ratio of the stock of government capital to the total size of the labor force in the urban sector, as production inputs. When $dco_P = 0$, there are no congestion effects. By contrast, When $dco_P > 0$, the larger the urban population is, the more congested public capital is, and the lower is its contribution to private urban production.

Private firms in the urban formal sector allocate their output to exports, E_P, or the domestic market, D_P, according to a production possibility frontier, defined by a constant elasticity of transformation (CET) function:

$$X_P = CET(E_P, D_P). \tag{13}$$

As shown later, the ratio E_P/D_P depends on the relative prices of exported and domestic goods.

3.2 Wages, Employment, Migration and Skills Acquisition

Unskilled workers in the economy may be employed either in the rural economy, U_R, or in the urban economy, U_U, whereas skilled workers are employed only in the urban economy. We also assume that skilled workers are not employed in the informal economy either—perhaps as a result of signaling considerations, as discussed later.

3.2.1 Rural Wages, Employment, and Internal Migration

The demand for labor in the export sector consistent with profit maximization, U^d_{AT}, is given by

$$U^d_{AT} = \left(V_{AT}^{1+\frac{\rho_{XAT}}{1-\eta_{XAT}}} \frac{1-\eta_{XAT}}{w_{AT}} \cdot \frac{\beta_{XAT}}{\alpha_{XAT}^{\rho_{XAT}}}\right)^{\frac{1}{1+\rho_{XAT}}}, \qquad \text{where } w_{AT} = \frac{W_A}{PV_{AT}}, \tag{14}$$

where W_A denotes the nominal wage in the agricultural sector and PV_{AT} the net output price in the traded agricultural sector (both determined below). Equation (14) indicates that labor demand in the rural export sector is positively related to the level of net output, V_{AT}, and negatively related to the effective product wage in that sector, w_{AT}.

The demand for labor in the nontraded agricultural sector is given by an equation similar to (14):

$$U_{AN}^d = \left(V_{AN}^{1+\frac{\rho_{XAN}}{1-\eta_{XAN}}} \frac{1-\eta_{XAN}}{w_{AN}} \cdot \frac{\beta_{XAN}}{\alpha_{XAN}^{\rho_{XAN}}} \right)^{\frac{1}{1+\rho_{XAN}}}, \qquad \text{where } w_{AN} = \frac{W_A}{PV_{AN}}, \tag{15}$$

with again w_{AN} denoting the product wage in that sector.

Nominal wages in agriculture, W_A, adjust to clear the labor market. With U_R representing labor supply in agriculture, the equilibrium condition is thus given by

$$U_R = U_{AN}^d(V_{AN}, \frac{W_A}{PV_{AN}}) + U_{AT}^d(V_{AT}, \frac{W_A}{PV_{AT}}). \tag{16}$$

The size of the labor force in the rural sector, U_R, is predetermined at any given point in time. Over time, U_R grows at the exogenous population growth rate, g_R, net of worker migration to urban areas, MIG:

$$U_R = U_{R,-1}(1+g_R) - MIG. \tag{17}$$

Following Harris and Todaro (1970), the incentives to migrate are taken to depend negatively on the ratio of the average expected *consumption* wage in rural areas to that prevailing in urban areas. Unskilled workers in the urban economy may be employed either in the formal sector, in which case they are paid a minimum wage, W_M, or they can enter the informal economy and receive the market-determined wage in that sector, W_I. When rural workers make the decision to migrate to urban areas, they are uncertain as to which type of job they will be able to get, and therefore weigh wages in each sector by the probability of finding a job in that sector. These probabilities are approximated by prevailing employment ratios. Finally, potential migrants also consider what their expected purchasing power in rural and urban areas will be, depending on whether they stay in the rural sector and consume the "typical" basket of goods of rural households, or migrate and consume the "typical" urban basket of goods.

The expected, unskilled urban real wage, Ew_U, is thus a weighted average of the minimum wage in the formal sector and the going wage in the informal sector, deflated by an urban consumption price index, P_{UU} (defined below):

$$Ew_U = \frac{\theta_U W_{M,-1} + (1-\theta_U) W_{I,-1}}{P_{UU,-1}}, \tag{18}$$

where θ_U is the probability of finding a job in the urban formal sector, measured by the proportion of unskilled workers in the private formal sector, relative to the total number of unskilled urban workers looking for a job in the urban formal sector (net of government employment), in the previous period:

$$\theta_U = \frac{U_{P,-1}}{U^s_{F,-1} - U_{G,-1}}. \tag{19}$$

A similar reasoning is used to calculate the expected rural consumption real wage, Ew_A. Here the employment probability is equal to unity, because workers can always find a job at the going wage. Assuming a one-period lag, we thus have

$$Ew_A = \frac{W_{A,-1}}{P_{R,-1}},$$

where P_R is the composite, rural consumption price index (defined below).

The migration function can therefore be specified as

$$MIG = U_{R,-1}\lambda_m \left[\sigma_M \ln\left(\frac{Ew_U}{Ew_A}\right)\right] + (1-\lambda_m)\frac{U_{R,-1}}{U_{R,-2}} MIG_{-1}, \tag{20}$$

where $0 < \lambda_m < 1$ measures the speed of adjustment and $\sigma_M > 0$ measures the elasticity of migration flows with respect to expected wages. This specification assumes that costs associated with migration or other frictions may delay the migration process, introducing persistence in migration flows.

3.2.2 Urban Unskilled Wages, Employment, and Unemployment

The public sector employs an exogenous number of unskilled workers, U_G, at the nominal wage rate W_{UG}, whereas the demand for unskilled labor by the formal private sector is determined by firms' profit maximization subject to the given minimum wage, W_M. Both wages are partially indexed to the overall consumer price index, $PLEV$:

$$W_{UG} = \omega_{UG} \cdot PLEV^{ind_{UG}}, \quad W_M = \omega_M \cdot PLEV^{ind_M}, \tag{21}$$

where ω_M and ω_{UG} measure real wages in constant terms, and $0 < ind_{UG}$, $ind_M \leq 1$. In the simulation exercises reported later, we actually assume that both wages are fully indexed ($ind_{UG} = ind_M = 1$).

Labor demand by the formal private sector is determined by firms' profit maximization. We assume also that firms pay a payroll tax, at the rate $0 < ptax_U < 1$ for unskilled workers, that is proportional to the wage bill, $W_M U_P$. Unskilled labor demand by the private sector is thus given by

$$U_P^d = T_1 \left(\frac{1}{(1 + ptax_U) w_M} \frac{\beta_{XP1}}{\alpha_{XP1}^{\rho_{XP1}}} \right)^{\sigma_{XP1}}, \text{ where } w_M = \frac{W_M}{PT_1}. \qquad (22)$$

In order to avoid corner solutions, we assume that the wage rate paid to unskilled labor in the formal urban sector is systematically greater than the real wage rate paid in the informal sector. Consequently, unskilled urban workers will first seek employment in the private formal sector. The actual level of employment in that sector is determined according to equation (22).

We also assume that, as a result of relocation and congestion costs, mobility of the unskilled labor force between the formal and the informal sectors is imperfect. Migration flows are determined by expected income opportunities, along the lines of Harris and Todaro (1970).[6] Specifically, the supply of unskilled workers in the formal sector (including public sector workers), U_F^s, is assumed to change gradually over time as a function of the expected wage differential across sectors, measured in real terms. Wage and employment prospects are formed on the basis of prevailing conditions in the labor market. Because there is no job turnover in the public sector, the expected nominal wage in the formal economy is equal to the minimum wage weighted by the probability of being hired in the Private sector. Assuming that hiring in that sector is random, this probability can be approximated by the ratio of currently employed workers to those seeking employment at the previous period, $U_{P,-1}^d / (U_{F,-1}^s - U_{G,-1})$. The expected nominal wage in the informal economy, W_I, is simply the going wage, because there are no barriers to entry in that sector. Assuming a one-period lag, changes in the supply of unskilled workers in the formal sector (measured in proportion of the total

[6]Note that in the present setup the Harris- Todaro framework is used to explain migration flows between the (urban) informal sector and the (urban) formal sector, rather than migration between the rural and the urban sectors.

urban unskilled labor force) thus evolves over time according to

$$\frac{\Delta U_F^s}{U_{U,-1}} = \beta_F \left[\sigma_F \ln \left(\frac{U_{P,-1}^d}{U_{F,-1}^s - U_{G,-1}} \frac{W_{M,-1}}{W_{I,-1}} \right) \right] + (1 - \beta_F) \frac{\Delta U_{F-1}^s}{U_{U,-2}}, \quad (23)$$

where $\beta_F > 0$ denotes the speed of adjustment.[7] The rate of unskilled unemployment in the formal sector, $UNEMP_U$, is thus given by

$$UNEMP_U = 1 - \frac{(U_G + U_P^d)}{U_F^s}. \quad (24)$$

The supply of labor in the informal economy, U_I^s, is obtained by subtracting from the urban unskilled labor force, U_U, the quantity $U_F^s + U_G$:

$$U_I^s = U_U - U_F^s. \quad (25)$$

The informal labor market clears continuously, so that $U_I^d = U_I^s$. From equations (8) and (25), the equilibrium nominal wage is thus given by

$$W_I = \beta_{XI} \left(\frac{PV_I V_I}{U_I^s} \right). \quad (26)$$

The urban unskilled labor supply, U_U, grows as a result of "natural" urban population growth and migration of unskilled labor from the rural economy, as discussed earlier. Moreover, some urban unskilled workers, SKL, do acquire skills and leave the unskilled labor force to increase the supply of skilled labor in the economy. We make the additional assumption that individuals are born unskilled, and therefore natural urban population growth (not resulting from migration or skills acquisition factors) is represented by urban unskilled population growth only, at the exogenous rate g_U. Finally, there are international migrations, the flow of which is measured by $IMIG$ (see below). Thus, the size of the urban unskilled labor supply evolves according to

$$U_U = U_{U,-1}(1 + g_U) + MIG - SKL - IMIG. \quad (27)$$

[7] As noted by Agénor (1999), the absence of on-the-job search in the informal sector in the present setup can be justified in a variety of ways. An important consideration is the existence of informational inefficiencies, which may result from the absence of institutions capable of processing and providing in a timely manner relevant information on job opportunities to potential applicants. As a result, search activities for unskilled workers in the formal sector may require, literally speaking, waiting for job offers at factory gates.

3.2.3 Urban Skilled Wages, Employment and Unemployment

As noted earlier, the employment levels of both skilled and unskilled workers in the public (urban) sector are taken as exogenous. The nominal wage that skilled workers earn, W_{SG}, is indexed on the relevant consumption price index:

$$W_{SG} = \omega_{SG} P_{US}^{ind_{SG}}, \tag{28}$$

where ω_{SG} is an exogenous real wage level, and $0 < ind_{SG} \leq 1$.[8]

Private urban firms pay a payroll tax on for skilled labor, at the rate $0 < ptax_S < 1$, which is proportional to the wage bill, $W_S S_P$. From (12), the demand for skilled labor is given by

$$S_P^d = T_2 \kappa_S \left(\frac{1}{(1 + ptax_S)\omega_S} \cdot \frac{\beta_{XP2}}{\alpha_{XP2}^{\rho_{XP2}}} \right)^{\sigma_{XP2}}, \quad \text{where } \omega_S = \frac{W_S}{PT_2}. \tag{29}$$

The nominal wage for skilled labor in the private sector, W_S, is determined on the basis of a "monopoly union" approach, as follows.[9] Let ω_S^c denote the *consumption* real wage, that is, the nominal wage earned by skilled workers deflated by the cost-of-living index that these workers face in the urban sector, P_{US}. ω_S^c is assumed set by a centralized labor union whose objective is to maximize a utility function that depends on deviations of both employment and the consumption wage from their target levels, subject to the firm's labor demand schedule. Specifically, the union's utility function is given by

$$U = (\omega_S^c - \omega_S^{cT})^{\nu} (S_P^d - S_P^T)^{1-\nu}, \quad 0 < \nu < 1, \tag{30}$$

where S_P^d is given by equation (29). The quantities ω_S^{cT} and S_3^T measure the union's wage and employment targets, respectively, and are both assumed predetermined with respect to ω_S^c. The parameter ν reflects the relative

[8] To avoid a corner solution in which no worker would want to seek employment in the public sector, we assume that working for the government provides a nonpecuniary benefit (perhaps in terms of higher job security or reduced volatility of future earnings) that is sufficiently large to ensure that the differential between W_{SG} and W_S is not "excessive" (in the sense that S_G remains positive at all times).

[9] See Agénor (2003) for a more detailed discussion. Alternatively, one could assume that firms and the union bargain over wages, with firms determining employment. As shown formally, by Creedy and McDonald (1991), from the point of view of wage determination this approach would not lead to a specification that differs much from the one derived below.

importance that the union attaches to wage deviations, as opposed to employment deviations.

Substituting the labor demand curve (29) in the utility function above, the union's problem is thus

$$\max_{\omega_S^c}(\omega_S^c - \omega_S^{cT})^\nu \left\{ T_2\kappa_S(\frac{PT_2}{P_{US}(1+ptax_S)\omega_S^c} \cdot \frac{\beta_{XP2}}{\alpha_{XP2}^{\rho_{XP2}}})^{\sigma_{XP2}} - S_P^T \right\}^{1-\nu}$$

The first-order condition is given by

$$\nu \left\{ \frac{S_P^d - S_P^T}{\omega_S^c - \omega_S^{cT}} \right\}^{1-\nu} - (1-\nu) \left\{ \frac{S_P^d - S_P^T}{\omega_S^c - \omega_S^{cT}} \right\}^{-\nu} \sigma_{XP2}(\frac{S_P^d}{\omega_S^c}) = 0,$$

or equivalently, normalizing the target level of employment S_P^T to zero:

$$\frac{\nu S_P^d}{\omega_S^c - \omega_S^{cT}} - \frac{(1-\nu)\sigma_{XP2}S_P^d}{\omega_S^c} = 0.$$

This expression can be solved for the optimal wage:

$$\omega_S^c = \frac{\omega_S^{cT}}{1 - \nu/(1-\nu)\sigma_{XP2}},$$

where we assume that $1 - \nu/(1-\nu)\sigma_{XP2} > 0$.

The union's target wage, ω_S^{cT}, is assumed to be related positively to skilled wages in the public sector (measured in terms of the relevant price index), ω_{SG}, and negatively to the skilled unemployment rate, $UNEMP_S$, and the firing cost per skilled worker, f_S. Wage-setting in the public sector is assumed to play a signaling role to wage setters in the rest of the economy. When unemployment is high, the probability of finding a job (at any given wage) is low. Consequently, the higher the unemployment rate, the greater the incentive for the union to moderate its wage demands and boost employment. Firing costs do prevent excessive job losses in bad times (thereby preventing the loss of firm-specific human capital if downturns are temporary) but they also discourage new hires—for instance because if workers prove to be inadequate matches with their job requirements, reversing mismatches is costly. The union internalizes the disincentive effect of severance payments on labor demand. As a result, the higher the firing cost, the greater the incentive for

the union to reduce its wage demands, in order to encourage firms to hire. The above expression can thus be rewritten as

$$W_S = P_{US} \frac{UNEMP_S^{-\phi_1} (f_S / P_{US})^{-\phi_2} \omega_{SG}^{\phi_3}}{1 - \nu/(1-\nu)\sigma_{XP2}}, \tag{31}$$

where $UNEMP_S$ is defined below. This equation implies, in particular, that a higher level of unemployment lowers the *level* of wages, as implied by various types of efficiency-wage models.

Given that firms set nominal wages and are on their labor demand curve, open skilled unemployment may emerge. The rate of skilled unemployment, $UNEMP_S$, is given by the ratio of skilled workers who are not employed either by the private or the public sector, divided by the total population of skilled workers:

$$UNEMP_S = \frac{S - S_G - S_P^d}{S}. \tag{32}$$

We assume that skilled workers who are unable to find a job in the formal economy opt to remain open unemployed, instead of entering the informal economy (in contrast to unskilled workers), perhaps because of adverse signaling effects.

The evolution of the skilled labor force depends on the rate at which unskilled workers acquire skills:

$$S = (1 - \delta_S) S_{-1} + SKL_{-1}, \tag{33}$$

where $0 < \delta_S < 1$ is the rate of "depreciation" or "de-skilling" of the skilled labor force.

3.2.4 Skills Acquisition

The acquisition of skills by unskilled workers is assumed to depend on three factors: *a)* relative expected consumption wages of skilled to unskilled urban workers (as a proxy for the future stream of earnings associated with higher levels of education); and *b)* the government stock of education capital, K_E, which limits the ability to invest in skills.

Consider first the effect of wages. In case they acquire skills, current unskilled workers expect to earn wage W_S if they are employed (with probability θ_S) and nothing if they are unemployed. The purchasing power of this

wage is obtained by deflating it by a skilled consumption price index, $P_{US,-1}$ (defined below):

$$Ew_S = \theta_S \frac{W_{S,-1}}{P_{US,-1}},$$

where θ_S is approximated by the initial ratio of the number of skilled workers employed in the private sector, over the total number of skilled workers that are not employed in the public sector:

$$\theta_S = \frac{S_{P,-1}}{S_{-1} - S_{G,-1}}. \tag{34}$$

If they remain unskilled, workers expect to get the average unskilled wage, which is a weighted average of the minimum wage W_M and the informal wage rate. Assuming, again, that there is no job turnover in the public sector, the average expected real wage is given by (18), which is repeated here for convenience:

$$Ew_U = \frac{\theta_U W_{M,-1} + (1 - \theta_U) W_{I,-1}}{P_{UU,-1}},$$

with θ_U as defined above.

Given these effects, the flow increase in the supply of skilled labor can be written as:

$$SKL = \lambda_S \left[\kappa_e \left(\frac{Ew_S}{Ew_U} \right)^{\sigma_W} (K_{E,-1})^{\sigma_E} \right] + (1 - \lambda_S) SKL_{-1},$$

where $0 < \lambda_S < 1$, and κ_e is a shift parameter.[10]

3.2.5 International Labor Migration

As noted earlier, international migrations are an important feature of the labor market in Morocco. We assume here that migration involves only unskilled workers, and that potential migrants are in the urban sector (as captured in (27)). Moreover, international migration flows are taken to be determined by two factors: the prevailing unskilled unemployment rate in the formal urban sector, and the expected urban real wage for unskilled labor,

[10]Note that we abstract from the cost of acquiring skills (as measured by the number of years of schooling multiplied by the average cost of education per year), which should also affect the propensity to invest in skills acquisition.

Ew_U, given by (18), relative to the expected foreign wage measured in terms of the domestic urban price index, Ew_F, defined as

$$Ew_F = \frac{ER \cdot W_{F,-1}}{P_{UU,-1}},$$

with W_F denoting the foreign wage measured in foreign-currency terms, assumed exogenous. Adopting a specification similar to (20), the migration function is specified as

$$IMIG = U_{U,-1}\lambda_{im}\left[\sigma_{IM}\ln\left(\frac{Ew_F}{Ew_U}\right)\right] + (1-\lambda_{im})\frac{U_{U,-1}}{U_{U,-2}}IMIG_{-1},$$

where $0 < \lambda_{im} < 1$ measures the speed of adjustment, and $\sigma_{IM} > 0$ the partial elasticity of migration flows with respect to expected wages. Again, costs associated with migration (such as relocation costs) are assumed to introduce some degree of persistence (see Lopez and Schiff (1998) for a further discussion). As discussed below, remittances associated with international migration flows of unskilled labor are assumed to benefit unskilled households in the urban formal and informal sectors.

3.3 Supply and Demand

Both the informal and public sector goods are nontraded. Total supply in each sector is thus equal to gross production, that is

$$Q_I^s = X_I, \quad Q_G^s = X_G. \tag{37}$$

Similarly, there are no imports of tradable agricultural goods, and part of it is exported. Total supply is thus equal to gross production minus exports, E_{AT}:

$$Q_{AT}^s = X_{AT} - E_{AT}. \tag{38}$$

Agricultural nontraded and private formal urban goods, by contrast, compete with imported goods. The supply of the composite good for each of these sectors consists of a CES combination of imports and domestically produced goods:

$$Q_{AN}^s = CES(M_{AN}, D_{AN}), \tag{39}$$

$$Q_P^s = CES(M_P, D_P), \tag{40}$$

where $D_{AN} = X_{AN}$, as noted earlier

Aggregate demand for each of these sectors consists of intermediate and final consumption, government spending, and investment demand. For the trade and nontraded agricultural sectors, aggregate demand (Q^d_{AN} and Q^d_{AT}) consists of demand for final consumption by the private sector (C_{AN} and C_I) and the government (G_{AN} and G_{AT}) and intermediate consumption (INT_{AN} and INT_{AT}):

$$Q^d_{AN} = C_{AN} + G_{AN} + INT_{AN}, \tag{41}$$

$$Q^d_{AT} = C_{AT} + G_{AT} + INT_{AT}, \tag{42}$$

For the informal sector, aggregate demand (Q^d_I) consists of demand for intermediate and final consumption only:

$$Q^d_I = C_I + INT_I, \tag{43}$$

Aggregate demand for the public good and the private formal good, Q^d_G and Q^d_P, consists of demand for intermediate and final consumption by households and the government, and investment demand, Z^G_P and Z^P_P by the formal private sector (as defined below), and Z_G by the government (which requires only private urban goods):

$$Q^d_G = C_G + G_G + Z^G_P + INT_G, \tag{44}$$

$$Q^d_P = C_P + G_P + (Z^P_P + Z_G) + INT_P. \tag{45}$$

In the above expressions, INT_j is defined as total demand (by all productions sectors) for intermediate consumption of good j:

$$INT_j = \sum_i a_{ji} X_i \qquad \text{for } j = AN, AT, I, P, G. \tag{46}$$

Government expenditure on good j, G_j, is expressed in real terms as:

$$G_j = gg_j \frac{NG}{PQ_j} \qquad \text{for } j = AN, AT, G, P, \tag{47}$$

where NG represents total government current expenditure on goods and services (which is fixed in nominal terms), PQ_h is the market price of goods

purchased by the government, and $\sum gg_j = 1$. Note that the government is assumed not to spend on informal sector goods.

Final consumption for each production sector i, C_i, is the summation across all categories of households of nominal consumption of good i, deflated by the demand price of good i:

$$C_i = \sum_h C_{ih} = \sum_h x_{ih} + \frac{\sum_h cc_{ih}(CON_h - \sum_i PQ_i x_{ih})}{PQ_i}, \tag{48}$$

where C_{ih} is consumption of good i by household h, x_{ih} is the subsistence (or autonomous) level of consumption of good i by household h, CON_h total nominal consumption expenditure by household h, and PQ_i the composite sales price of good i (defined below). Equations (??) are based on the linear expenditure system. Coefficients cc_{ih} indicate how total nominal consumption expenditure by household h, CON_h, is allocated to each type of good and satisfy the restrictions:

$$0 < cc_{ih} < 1, \ \forall i, h, \ \sum_i cc_{ih} = 1.$$

Finally, total private investment by private urban firms, Z_P, consists of purchases of both public and urban formal private goods and services (Z_P^G and Z_P^P, respectively):

$$Z_P^i = zz_i \frac{PK \cdot Z_P}{PQ_i}, \text{ where } zz_G + zz_P = 1.$$

Coefficients zz_i measure the allocation of total investment demand to public and urban private goods.

3.4 External Trade

Exports of the tradable agricultural good are determined as a residual, once domestic demand is satisfied. From (38) and (42), and setting $Q_{AT}^s = Q_{AT}^d$, exports are thus determined by

$$E_{AT} = X_{AT} - (C_{AT} + G_{AT} + INT_{AT}). \tag{49}$$

As indicated earlier, firms in the private formal sector allocate their output to exports or the domestic market according to the production possibility

frontier (PPF) specified in equation (13). Efficiency conditions yield:

$$E_P = D_P \left(\frac{PE_P}{PD_P} \cdot \frac{1-\beta_{TP}}{\beta_{TP}} \right)^{\sigma_{TP}} \tag{50}$$

where PE_P is the price of exports and PD_P the price of domestic sales (determined below).

We assume that imports compete with domestic goods in the agricultural nontraded sector as well as in the private formal sector. Making use of Armington functions for the demand for imported vs. domestic goods and relative prices, import demand for both sectors (M_A and M_P) can be written as:

$$M_{AN} = D_{AN} \left(\frac{PD_{AN}}{PM_{AN}} \cdot \frac{\beta_{QA}}{1-\beta_{QA}} \right)^{\sigma_{QA}} \tag{51}$$

$$M_P = D_P \left(\frac{PD_P}{PM_P} \cdot \frac{\beta_{QP}}{1-\beta_{QP}} \right)^{\sigma_{QP}} \tag{52}$$

These equations show that the ratio of imports to both categories of domestic goods depends on the relative prices of these goods and the elasticity of substitution, σ_{QA} and σ_{QP}, between these goods.

3.5 Prices

The net or value added price of output is given by the gross price, PX_i, net of indirect taxes, less the cost of intermediate inputs (purchased at composite prices):

$$PV_i = V_i^{-1} \left\{ PX_i(1 - indtax_i) - \sum_j a_{ji} PQ_j \right\} X_i, \quad i,j = AN, AT, I, P, G, \tag{53}$$

where $indtax_i$ is the rate of indirect taxation of output in sector i (with $indtax_I = 0$ because there is no indirect taxation of informal sector output).

The world prices of imported and exported goods are taken to be exogenously given. The domestic currency price of these goods is obtained by adjusting the world price by the exchange rate, with import prices also adjusted by the tariff rate, tm:

$$PE_i = wpe_i ER, \text{ for } i = AT, P, \tag{54}$$

$$PM_i = wpm_i(1 + tm_i)ER, \text{ for } i = AN, P. \tag{55}$$

Because the transformation function between exports and domestic sales of the urban private good is linear homogeneous, the sales price, PX_P, is derived from the expenditure identity:

$$PX_P X_P = PD_P D_P + PE_P E_P,$$

that is,

$$PX_P = \frac{PD_P D_P + PE_P E_P}{X_P}, \tag{56}$$

with PD_P determined from the equality between the supply of composite goods (40) and the demand for these goods (45).

For the informal and public sectors (both of which do not export and do not compete with imports), the sales price is equal to the domestic market price. In the agricultural sector, the sales price of the traded agricultural good, PX_{AT}, is simply the domestic-currency price of agricultural exports, PE_{AT}, whereas the sales price of the non-traded good, PX_{AN}, is equal to the domestic price of agricultural goods, PD_{AN}.

For the nontraded agricultural sector and private urban production, the substitution function between imports and domestic goods is also linearly homogeneous, and the (composite) market price is determined accordingly by the expenditure identity:

$$PQ_i Q_i^d = PD_i D_i + PM_i M_i, \text{ for } i = AN, P,$$

that is

$$PQ_i = \frac{PD_i D_i + PM_i M_i}{Q_i^d}, \text{ for } i = AN, P, \tag{57}$$

with $Q_{AN}^d = Q_{AN}^s$.

For those sectors that do not compete with imports (informal and public goods), the domestic price, PD_i, is simply equal to the market price, PX_i:

$$PD_i = PX_i, \text{ for } i = I, G. \tag{58}$$

The nested CES production function of private formal urban goods is also linearly homogeneous; prices of the composite inputs are therefore derived in similar fashion:

$$T_1 PT_1 = T_2 PT_2 + (1 + ptax_U) W_M U_P. \tag{59}$$

$$T_2PT_2 = PROF_P + (1 + ptax_S)W_S S_P, \tag{60}$$

where $PROF_P$ is profits by private sector firms in the urban formal sector (defined below).

The price of (private) capital is constructed by using the investment expenditure identity for private firms, which involves those goods for which there is investment demand, namely, the public good and private-formal urban good (see equations (44) and (45)):

$$PK = \frac{PQ_G Z_P^G + PQ_P Z_P^P}{Z_P}. \tag{61}$$

In solving the model, we use equations (37) to determine the equilibrium quantities Q_I and Q_G, that is, equations (6) and (9), respectively. We use the demand equations (43) and (44) to solve residually for C_I and C_G, that is:

$$X_I - INT_I = C_I, \tag{62}$$

$$X_G - G_G - Z_G - INT_G = C_G. \tag{63}$$

Equation (48) for $i = I, G$, is then solved for $PQ_I = PX_I$ and $PQ_G = PX_G$, respectively. Define discretionary consumption expenditure of household h, $COND_h$, as

$$COND_h = CON_h - \sum_i PQ_i x_{ih}, \tag{64}$$

and define the share of autonomous consumption of good i in total consumption of good i, ac_i, as

$$ac_i = \frac{\sum_h PQ_i x_{ih}}{PQ_i C_i} = \frac{\sum_h x_{ih}}{C_i}. \tag{65}$$

Then, from (48), we have

$$PX_i = (1 - ac_i)^{-1} \cdot \left\{ \frac{\sum_h cc_{ih} COND_h}{C_i} \right\}, \quad i = I, G. \tag{66}$$

The consumption price index for the rural sector is given by

$$P_R = \sum_i wr_i PQ_i,$$

whereas the consumption price indexes for urban unskilled and skilled workers are given by

$$P_{UU} = \sum_i wu_i PQ_i, \quad P_{US} = \sum_i ws_i PQ_i, \tag{67}$$

where the wr_i, wu_i and ws_i are relative weights that are such that

$$\sum_i wr_i = \sum_i wu_i = \sum_i ws_i = 1.$$

3.6 Profits and Income

Firms' profits are defined as revenue minus total labor costs. In the case of agricultural traded and nontraded sector firms, profits are given by

$$PROF_i = PV_i V_i - W_A U_i, \text{ for } i = AT, AN, \tag{68}$$

whereas in the case of the urban informal sector firms, we have

$$PROF_I = PV_I V_I - W_I U_I. \tag{69}$$

Profits of private-urban sector firms account for salaries paid to both categories of workers:

$$PROF_P = PV_P V_P - (1 + ptax_U) U_P W_M - (1 + ptax_S) S_P W_S - FC, \tag{70}$$

where total firing costs are given by

$$FC = f_U \max(0, U_{P,-1} - U_P) + f_S \max(0, S_{P,-1} - S_P), \tag{71}$$

with f_S, f_U denoting the fixed firing cost per worker (skilled and unskilled, respectively).

Firms' income is equal to profits minus corporate taxes and interest payments on foreign loans. Assuming that only firms in the formal urban economy accumulate capital and pay income taxes yields:

$$YF_i = PROF_i, \text{ for } i = AN, AT, I, \tag{72}$$

$$YF_P = (1 - inctax_F) PROF_P - IF \cdot ER \cdot FL_{P,-1}, \tag{73}$$

where $inctax_F$ is the corporate income tax rate, IF is the foreign interest rate (taken to be exogenous), and FL_P is the level of foreign borrowing by private-urban firms. The path of FL_P is set exogenously, to account implicitly for ceilings that domestic firms may face in their access to foreign markets.

Household income is based on the return to labor (salaries), distributed profits, and transfers. Households are defined according to both labor categories and their sector of location.

- There are two types of rural households,one comprising workers employed in the traded sector, and the other workers in the non-traded sector.
- In the urban sector there are two types of unskilled households, those working in the informal sector and those employed in the formal sector.
- The fifth type of household consists of skilled workers employed in the formal urban economy (in both the private and public sectors).
- There are capitalist-rentier households whose income comes from firms' earnings in the formal private sector, the agricultural traded sector and commercial banks.

We further assume that households in both the non-traded agricultural sector and in the informal urban economy own the firms in which they are employed—an assumption that captures the fact that firms in these sectors tend indeed to be small, family-owned enterprises.

Income of the agricultural nontraded household is given by

$$YH_{AN} = YF_{AN} + W_A U_{AN} + \gamma_{AN} TRH, \tag{74}$$

where $0 < \gamma_{AN} < 1$ is the portion of total government transfers (TRH) that the group receives, $W_A U_{AN}$ denote wage earnings, and YF_{AN} firms' income in these sectors.

Income of the urban informal household is given by

$$YH_I = YF_I + W_I U_I + \gamma_I TRH + \tau_I ER \cdot REMIT, \tag{75}$$

where $0 < \gamma_I < 1$, $W_I U_I$, and YF_I have the same interpretation as above. $REMIT$ measures the foreign-currency value of the flow of remittances from

(unskilled) workers employed abroad, and $0 < \tau_I < 1$ the fraction of these remittances that are allocated to households in the informal economy.

Income of the agricultural traded sector household, as well as that of the urban formal skilled household, depends on government transfers and salaries, and possibly redundancy payments. Firms provide no source of income, because these groups do not own the production units in which they are employed:

$$YH_{AT} = W_A U_{AT} + \gamma_{AT} TRH, \tag{76}$$

$$YH_S = (W_S S_P + W_{SG} S_G) + f_S \max(0, S_{P,-1} - S_P) + \gamma_S TRH, \tag{77}$$

where $0 < \gamma_{AT}, \gamma_S < 1$.

Similarly, in the absence of any income from firms, income of the urban formal unskilled household depends on government transfers, salaries (from both private and the public sectors), remittances from abroad, and possibly redundancy payments:

$$\begin{aligned} YH_{UF} &= \gamma_{UF} TRH + W_M U_P + W_{UG} U_G + f_U \max(0, U_{P,-1} - U_P) \\ &\quad + (1 - \tau_I) ER \cdot REMIT, \end{aligned} \tag{78}$$

where $0 < \gamma_{UF} < 1$. As noted earlier, foreign remittances are allocated either to informal sector households or unskilled urban households.

Firms' income in the traded agricultural and private urban sectors goes to the capitalist-rentier household. Because there is no capital accumulation in the traded agricultural sector to be financed, the entire amount of firms' profits from that sector are transferred to the capitalist-rentier household. By contrast, firms in the private urban sector retain a portion of their after-tax earnings, $0 < re < 1$, for investment financing purposes and transfer the remainder to the capitalist-rentier household, whose income is thus:

$$YH_{KAP} = YF_{AT} + (1 - re) YF_P + \gamma_{KAP} TRH, \tag{79}$$

where $0 < \gamma_{KAP} < 1$.

3.7 Consumption, Savings, and Investment

Each category of household h saves a constant fraction, $0 < savrate_h < 1$, of its disposable income:

$$SAV_h = savrate_h (1 - inctax_h) YH_h, \tag{80}$$

where $0 < inctax_h < 1$ is the income tax rate applicable to household h.

The portion of disposable income that is not saved is allocated to consumption:

$$CON_h = (1 - inctax_h)YH_h - SAV_h.$$

The accumulation of capital over time depends on the flow level of investment, Z_P, and the depreciation rate of capital from the previous period, δ_P:[11]

$$K_P = K_{P,-1}(1 - \delta_P) + Z_{P,-1}, \tag{81}$$

where $0 < \delta_P < 1$ is a constant depreciation rate.

The aggregate identity between savings and investment implies that total investment, given by $PK \cdot Z_P + PQ_P Z_G$, must be equal to total savings, equal to firms' after-tax retained earnings, total after-tax household savings, government savings, and foreign borrowing by firms and the government:

$$PK \cdot Z_P + PQ_P Z_G = re \cdot YF_P + \sum_h SAV_h - CDEF + ER(\Delta FL_P + \Delta FL_G), \tag{82}$$

where FL_G is foreign borrowing by the government (assumed exogenous in foreign-currency terms) and $CDEF$ the current public budget deficit (defined below). In the simulations reported below, this equation is solved residually for the level of private investment, Z. Thus, the model is "savings driven" (corresponding to the "classical" closure rule discussed by Dewatripont and Michel (1987)) a reasonable assumption in our view for Morocco, in light of the behavior of net saving during the second part of the 1990s. Indeed, during the period 1996-99, net government dissaving was accompanied by an increase in net private saving, which may have resulted from private investment being lower than otherwise. In addition, as noted by Schmidt-Hebbel and Muller (1992) in their review of the behavior of private investment during the period 1970-88, public sector deficits had a stroing negative impact on private capital formation in Morocco. Of course, alternative closure rules are possible. For instance, with private investment treated as exogenous, equation (82) could be solved for the savings rate of capitalists-rentiers, as in Agénor (2003). This closure rule would make the model "investment driven."

[11] Capital gains or losses associated with changes in the price of capital are assumed to affect changes over time of firms' net worth (given by $PK \cdot K - ER \cdot FL_P$), without any direct feedback on the economy.

3.8 Government

Government expenditures consist of government consumption, which only has demand-side effects, and public investment, which has both demand- and supply-side effects. Public investment consists of investment in infrastructure, education, and health.[12] We define investment in infrastructure as the expenditure affecting the accumulation of public infrastructure capital, which includes public assets such as roads, power plants and railroads. Investment in education affects the stock of public education capital, which consists of assets such as school buildings and other infrastructure affecting skills acquisition, but does not represent human capital. In a similar fashion, investment in health adds to the stock of public assets such as hospitals and other government infrastructure affecting health.

From (10), $PV_G V_G - (W_{UG} U_G + W_{SG} S_G) = 0$, that is, all value added in the production of public goods is distributed as wages. Thus, the *current* fiscal deficit, $-CDEF$, is defined as

$$-CDEF = TXREV - TRH - NG - IF_G ER \cdot FL_{G,-1}, \tag{83}$$

where $TXREV$ denotes total tax revenues, TRH total government transfers to households, NG total current expenditure on goods and services, and IF_G the interest rate on public foreign borrowing. The last term on the right-hand side measures interest payments on foreign loans.

Net government saving is equal to minus the *overall* government budget deficit, $-ODEF$, and is obtained by adding public investment expenditure to the current fiscal deficit:

$$-ODEF = -CDEF - PQ_P Z_G, \tag{84}$$

where, given our assumption that only the private urban good is used for capital accumulation, we calculate nominal investment outlays by multiplying Z_G by the composite price, PQ_P.

Total tax revenues, $TXREV$, consist of revenue generated by import tariffs, sales taxes, income taxes (on both households and firms in the urban

[12] It should be noted that this treatment of public investment differs from standard data classification reported in national accounts; in many instances these investments are classified as current expenditures.

private sector), and payroll taxes:

$$\begin{aligned} TXREV &= (wpm_{AN}tm_{AN}M_{AN}ER) + (wpm_Ptm_PM_PER) \\ &\quad + \sum_i indtax_iPX_iX_i + inctax_{KAP}YH_{KAP} \\ &\quad + inctax_r(YH_{AT} + YH_{AN}) + inctax_{UU}(YH_{UF} + YH_S) \\ &\quad + ptax_UW_MU_P + ptax_SW_SS_P + inctax_FPROF_P. \end{aligned} \tag{85}$$

Government investment is the sum of investment in infrastructure, I_{INF}, investment in health, I_H, and investment in education, I_E, which are all considered exogenous policy variables:

$$Z_G = I_{INF} + I_E + I_H. \tag{86}$$

Government investment increases the stock of public capital in either infrastructure, education or health. The stock of public capital in education includes items such as school buildings, whereas the stock of health capital includes hospitals and the like. Infrastructure capital includes all other stocks of public property, such as roads, railroads, and power plants. Accumulation of each type of capital is defined as:

$$K_i = K_{i,-1}(1 - \delta_i) + I_{i,-1}, \text{ where } i = INF, H, E, \text{ and where } 0 < \delta_i < 1, \tag{87}$$

where $0 < \delta_i < 1$ is a depreciation rate.

Infrastructure and health capital affect the production process in the private sector as they both combine to produce the stock of government capital, K_G:

$$K_G = CES(K_{INF}, K_H). \tag{88}$$

Given the aggregate saving-investment balance defined earlier (equation (82)), fiscal balance ($ODEF = 0$) does not need to be imposed period by period; all else equal, a higher public deficit would translate (all else equal) into lower private investment. However, in simulations where the deficit is held constant (and normalized at zero), fiscal balance is imposed by solving (83) residually for NG_C.

3.9 Balance of Payments

The external constraint implies that any current account surplus (or deficit) must be compensated by a net flow of foreign capital, given by the sum of

changes in foreign loans made to the government, ΔFL_G, and to private firms, ΔFL_P:

$$\begin{aligned} 0 &= \sum_i (wpe_i E_i - wpm_i M_i) \\ &\quad + REMIT - IF \cdot FL_{P,-1} - IF_G FL_{G,-1} \\ &\quad + \Delta FL_G + \Delta FL_P, \end{aligned} \tag{89}$$

where the flow of remittances is given by

$$REMIT = W_F FORL_{-1}, \tag{90}$$

with W_F denoting again the foreign wage measured in foreign-currency terms, and $FORL$ the stock of domestic workers abroad, given by

$$FORL = (1 - \delta_{IMIG}) FORL_{-1} + IMIG, \tag{91}$$

where $0 < \delta_{IMIG} < 1$ is the rate of "attrition" of the stock of migrants.

In the simulations reported below, we assume that public foreign borrowing is exogenous in equation (89), and that private foreign borrowing adjusts to equilibrate the balance of payments. Equation (90) indicates that there is a one-period lag between changes in the number of migrants abroad and the flow of remittances. In the simulations reported below, official reserves are assumed to adjust to equilibrate the balance of payments.

Walras' Law implies that one equilibrium condition may be dropped, because it will be automatically satisfied if all the other equilibrium conditions hold. Instead of dropping one equation, the computer program checks numerically for continuous equality between savings and investment, as given in (82).

Appendix C discusses the calibration of the model, and our choice of parameter values. Essentially, the model is calibrated using a social accounting matrix, which is described at length in Abdelkhalek (2003). Estimates of the various stock variables appearing in the model (such as the stock of private capital, and the stock of public capital in infrastructure, health and education), were obtained by using conventional perpetual inventory methods. The parameter values that we have selected are taken as much as possible from the existing literature on Morocco (such as export and import elasticities) but are also in part "educated guesses," regarding most notably the relative importance of skilled wages, as opposed to skilled employment, in the trade

union's utility function (equation (30)), and the leadership effect of public sector wages in the union's target wage (equation (31)). These parameters are obviously important in assessing the labor market effects of a variety of policy shocks. Although we limit ourselves below to presenting a small set of experiments, assessing the sensitivity of the results to alternative values of these parameters, as well as various others for which guesses need to be made, is essential to assess the robustness of the policy conclusions that one can draw from the model.

4 Policy Experiments

As noted in the foregoing discussion, the constraints and challenges that Morocco faces in reforming its labor market are the result of a variety of structural factors, including the demographic structure of the population, the lack of sustained rates of economic growth (which translate into weak growth in labor demand), the high degree of vulnerability of the economy to exogenous shocks (such as weather-related shocks, and the business cycle in industrial countries), and to the distortions introduced by existing labor market regulations. In a context of high and persistent unemployment, we argued that labor market reforms should be at the forefront of the policy agenda in Morocco.

Many economists have argued that reducing hiring and firing regulations, restricting the scope of minimum wages (particularly among the young and unskilled), reducing nonwage labor costs and payroll taxes, and moderating the influence of trade unions in the collective bargaining process would improve flexibility and have a positive effect on growth and the demand for labor, thereby reducing unemployment.[13] The quantitative framework described earlier can indeed be used to provide quantitative estimates of the effects of these various labor market policies on resource allocation, the rate of economic growth, and unemployment in Morocco. Specifically, we focus here on the impact of a reduction in the minimum wage (which is binding only for

[13]For instance, a study of 19 Latin American countries by Rama (1995) showed that economies with more flexible labor regimes enjoy higher productivity and faster growth, compared to those with a rigid labor code. Others have argued that the fairly limited impact of trade unions and other distortions on the labor market was an essential contributing factor to the sustained growth rates achieved in East Asia prior to the1997-98 crisis.

unskilled workers in the urban informal economy), and a reduction in payroll taxes on unskilled labor paid by urban private sector firms. We consider a non-neutral shock in the second case, that is, there is no offsetting change in revenue, and the government borrows domestically to balance its (current) budget—implying therefore full crowding out of private investment, as implied by the savings-investment balance (equation (82)). As noted below, this allows us to illustrate the importance of linking labor market reforms and fiscal adjustment.

4.1 Cut in the Minimum Wage

The simulation results associated with a permanent, 5 percent reduction in the minimum wage are illustrated in Tables 1 and 2, which display percentage or absolute changes from the baseline solution for a variety of sectoral, macroeconomic, and structural variables. Public consumption, investment, and transfers to households are kept constant, whereas taxes adjust endogenously to respond to fluctuations in output, income, and spending on domestic and foreign goods.

The impact effect of the reduction in the minimum wage is an increase in the demand for unskilled labor in the private sector by about 3.7 percent in the first year. This increase in demand is met by the existing pool of unskilled workers seeking employment in the urban sector. As a result, the unskilled unemployment rate drops significantly, by about 2.4 percentage points in the first and subsequent years.

In the medium and longer term, as the expected unskilled wage in the formal economy falls, formal-informal, rural-urban, and domestic-international migration dynamics set in. First, the increase in private formal sector employment (at the initial supply of unskilled workers in the formal sector) raises the probability of finding a job in that sector; however, this is not sufficient to offset the reduction in the minimum wage itself, and the expected formal sector wage for unskilled workers falls (by about 2 percentage points in the second year, for instance, relative to the informal sector wage). This leads to a reduction in the number of workers willing to queue for employment in the formal economy. After 10 years, the reduction in unskilled unemployment is about 2.6 percentage points, slightly higher than the impact effect. The overall reduction in the number of unskilled workers seeking employment in the formal private sector is accompanied by an increase in labor supply in the informal economy, which tends to push wages down in

that sector. However, at the same time, the expected urban-rural wage falls, thereby reducing migration flows to urban areas and the supply of labor in the informal sector. The net effect is indeed a reduction in the supply of workers in the informal economy (with employment falling by about 0.5 percent in period 3, 1.1 percent in period 5, and 1.7 percent in periods 8 to 10), which tends to put upward pressure on informal sector wages. This tends to further dampen the incentive to queue for employment in the formal private sector. But overall, both employment and activity fall in the informal sector, with real value added dropping by 0.14 percent in the long run. At the same time, the reduction in rural-to-urban migration flows is accompanied by lower wages, higher employment, and higher output in agriculture in the longer run, with real value added in both the traded and nontraded sectors increasing by about 0.1 percent after 10 years.

The initial reduction in the expected unskilled urban wage relative to the foreign wage increases incentives to migrate abroad; but due to the parameters of the model (the wage elasticity of these flows is assumed to be relatively small, and there is a high degree of persistence) international migration flows fall by only a small amount (when measured in proportion of the total urban unskilled labor force). The increase in the number of international migrants means also a reduction in the domestic supply of unskilled labor, which exerts upward pressure on informal sector wages, thereby mitigating the initial effects on migration. Over time, because real informal sector wages (measured in the price of the urban consumption basket) tend to increase, whereas at the same time the real wage in agriculture tends to fall, migration flows from rural to urban areas tend to fall as well, as noted earlier.

The reduction in the minimum wage, by reducing the relative cost of unskilled labor, also leads to some substitution among production factors over time. Because unskilled labor has a relatively high degree of substitution with respect to the composite factor consisting of skilled labor and physical capital (both public and private), the lower cost of that category of labor gives indeed an incentive to firms to substitute away from the skilled labor-physical capital bundle. However, this effect is not large, despite the fact that the skilled wage rises slightly after period 3, as a result of an increase in the price of the consumption basket of the skilled household (see Table 2), as implied by (31). In fact, the supply of skilled labor barely changes during the simulation period, given that the public stock of capital in education, and the number of teachers, are both exogenous. However, because of the overall effect of output growth on labor demand (real value added in the urban

formal sector rises over time, to about 0.2 percent in periods 9 and 10), skilled employment tends to increase. As a result, the skilled unemployment rate also falls slightly over time.

The effect on real GDP is negligible during the first few years but tends to increase somewhat over time, as a result of the growth in real value added in agriculture and the urban formal sector. Aggregate disposable income, and private consumption and investment also tend to increase during the simulation horizon. Real disposable income and private consumption follow a similar pattern for each household group, except for unskilled workers in the formal urban sector.

Regarding the government budget, there are two effects to consider. First, the price of the consumption basket for the urban skilled and unskilled households rises slightly over time (as a result of an increase in the demand for private formal goods), the nominal wage at which the government pays its workers increases also slightly over time (see equations (21) and (28)). Given that employment of both categories of workers is exogenous, the wage bill increases slightly (see Table 2), but this has no effect on the government current fiscal balance, as indicated in equation (83). Second, activity, private consumption, and imports tend to increase slightly over time, so that tax revenue inreases also. Both consumption and investment spending fall as a proportion of GDP, thereby reducing borrowing from domestic agents. Thus, given the macroeconomic "closure" rule adopted here, the reduction in government borrowing needs exerts a "crowding in" effect on private investment, which increases in real terms by 0.4 percent after 10 years. The gradual increase in private physical capital accumulation has both short-term effects (which take the form of upward pressures on aggregate demand and prices) but also longer-term, supply-side effects, because it affects the marginal productivity of (and thus the demand for) all categories of labor.

4.2 Reduction in Payroll taxes on Unskilled Labor

The simulation results associated with a permanent, 5 percentage point reduction in the payroll tax rate on unskilled labor are illustrated in Tables 3 and 4. As indicated earlier, we assume that the shock is non-neutral, implying that domestic borrowing by the government may exert a full crowding out of private investment.

The impact effect of this shock is qualitatively similar to a cut in the minimum wage: by reducing the effective cost of unskilled labor, it tends to

increase immediately the demand for that category of labor, by almost 3.4 percent in the first and subsequent three years. The unskilled unemployment rate drops by 2 percentage points on impact. Over time, the adjustment process of the labor market follows the same type of dynamics described earlier, except that now these dynamics operate in reverse: because the minimum wage does not change, and the probability of employment rises (as a result of the initial effect on labor demand of the tax cut on the cost of labor), the expected formal-to-informal sector wage ratio for unskilled workers *increases*, by about 4.1 percent in period 2. This tends to draw labor out of the informal sector, thereby leading to an increase in the number of unskilled job seekers in the formal sector. At the same time, the increase in the expected urban wage draws labor out of the rural sector and into the informal economy. The net result is an increase in informal sector employment and a fall in informal sector wages. The reduction in employment in agriculture also leads to higher wages there. The drop in the expected urban unskilled wage leads to a fall in international migration flows.

In the long term, real value added falls in all sectors—except the informal economy, which ends up absorbing part of the labor force that previously was seeking employment abroad. The reason is that the increase in government borrowing needs due initially to the reduction in the payroll tax tend to crowd out private investment, thereby reducing demand for formal sector goods and activity there. This tends to have also an adverse effect on tax revenue over time, thereby compounding the problem. Indeed, as the public deficit increases, the rate at which private investment falls also increases over time (from -0.3 percent in period 2 to -0.9 percent in period 5, -1.9 percent in period 8, and -3.0 percent in period 10), generating therefore an unsustainable "downward" spiral of low activity, low employment and rising deficits. In fact, after falling initially by 2 percentage points relative to its baseline value, the unskilled unemployment rate starts increasing again as a result of the reduction in the overall demand for labor in the formal economy, in addition to the increase in the number of job seekers in the formal economy—dropping by only 1.2 percent in period 10. The reduction in private investment lowers aggregate demand, puts downward pressure on prices, and slows physical capital accumulation—thereby reducing growth in the demand for all categories of labor over time. Skilled employment in the private sector falls at an increasing rate over time, due to its high degree of complementarity with physical capital.

Thus, this simulation illustrates an important result—given the link be-

tween government borrowing needs and the private savings-investment balance, labor market reforms that entail an initial adverse effect on the government budget may do more harm than good if they are not accompanied by adequate fiscal reforms.

5 Concluding Remarks

Reducing unemployment and raising the rate of economic growth are key policy challenges in Morocco today. The purpose of this paper has been to develop a quantitative framework that allows an analysis of the impact of a variety of macroeconomic and structural policies on growth and the labor market in Morocco. The first part of the paper provided an overview of the Moroccan labor market, and identified some of the constraints challenges that the country will continue to face in the coming years. The second part presented our quantitative framework, which captures many of the characteristics of Morocco's labor market, such as skilled and unskilled urban unemployment, the existence of firing costs, and a signaling role of public sector wages on the union's target wage, and payroll taxation in the private urban formal sector. The extent to which high payroll taxes have tended to discourage the demand for unskilled labor has been an important policy issue in Morocco. Our framework allows us to consider how changes in these taxes affect employment and wages, taking into account their fiscal effects.

The third part of the paper presented simulation results associated with a cut in the minimum wage and a reduction in payroll taxation on unskilled labor, under the assumption that government domestic borrowing exerts a full crowding out on private investment. We showed that both policies may lead to a reduction in unskilled unemployment in the short term, and that the process of adjustment of the labor market involves various types of dynamics, rural to urban migration, formal-informal adjustment in labor supply, and domestic-international labor flows. However, our second set of simulation results also illustrates the potential problem associated with labor market reforms—the increase in government borrowing needs due initially to the reduction in the payroll tax was shown to crowd out private investment, thereby reducing demand for formal sector goods, activity, and demand for both categories of labor. The fall in output tends also to reduce tax revenue, thereby leading to an unsustainable increase in fiscal deficits over time. Thus, tax-based labor market reforms in Morocco may bring few benefits in the long

run if they are not accompanied by adequate fiscal adjustment.

The policy experiments considered here could be extended in a variety of directions. For instance, one could consider budget-neutral changes in payroll taxation on unskilled labor involving adjustment in income taxes, reductions in transfers, or taxes on domestic sales. Although the qualitative implications of these alternative budget closure rules may be similar to those described earlier, the quantitative effects may differ significantly, particularly on the composition of employment in the formal sector. In addition, there are a variety of other labor market policies that can be analyzed in the present setting, such as the impact of reductions in firing costs, public sector layoffs (possibly coupled with an increase in employment subsidies to private, formal sector firms), changes in trade unions preferences between wages and employment. As noted earlier, firing costs have often been considered to be a major obstacle to labor market flexibility in Morocco (as well as in many other countries), because by constraining the ability of firms to react to adverse shocks, they lead them to restrain (permanent) hiring in "good" times and to rely more on casual or temporary labor. Another important policy exercise would be to examine the effects of changes in the composition of public expenditure (that is, the allocation between investment in infrastructure, education, and health) on growth and employment.

Although some of these policy experiments would be useful in designing an appropriate sequence of labor market reforms for Morocco, the key policy message of the simulations reported in this paper is likely to remain valid: labor market reforms that entail large fiscal effects may not be sufficient, by themselves, to increase employment durably. They need to be seen in the context of a broader policy package (involving most likely significant changes in the allocation of public investment) designed to spur growth.

Appendix A
List of Equations[14]

PRODUCTION

$$V_{AN} = \left[\alpha_{XAN}\left\{\beta_{XAN}U_{AN}^{-\rho_{XAN}} + (1-\beta_{XAN})K_G{}^{-\rho_{XAN}}\right\}^{-\frac{1}{\rho_{XAN}}}\right]^{1-\eta_{XAN}} \tag{A1}$$

$$X_{AN} = V_{AN} + X_{AN}\sum_i a_{iAN} \tag{A2}$$

$$V_{AT} = \left[\alpha_{XAT}\left\{\beta_{XAT}U_{AT}^{-\rho_{XAT}} + (1-\beta_{XAT})K_G^{-\rho_{XAT}}\right\}^{-\frac{1}{\rho_{XAT}}}\right]^{1-\eta_{XAT}} \tag{A3}$$

$$X_{AT} = V_{AT} + X_{AT}\sum_i a_{iAT} \tag{A4}$$

$$V_I = \alpha_{XI}U_I^{\beta_{XI}}, \qquad \alpha_{XI} > 0, \quad 0 < \beta_{XI} < 1. \tag{A5}$$

$$X_I = V_I + X_I\sum_i a_{iI} \tag{A6}$$

$$X_G = V_G + X_G\sum_i a_{iG} \tag{A7}$$

$$V_G = (W_{UG}U_G + W_{SG}S_G)/PV_G \tag{A8}$$

$$X_P = V_P + X_P\sum_i a_{iP} \tag{A9}$$

$$V_P = \alpha_{XP}\left\{\beta_{XP}T_1^{-\rho_{XP}} + (1-\beta_{XP})\left(\frac{K_G}{(U_U+S)^{dco_P}}\right)^{-\rho_{XP}}\right\}^{-\frac{1}{\rho_{XP}}} \tag{A10}$$

$$T_1 = \alpha_{XP1}\{\beta_{XP1}T_2^{-\rho_{XP1}} + (1-\beta_{XP1})U_P^{-\rho_{XP1}}\}^{-\frac{1}{\rho_{XP1}}} \tag{A11}$$

$$T_2 = \alpha_{XP2}\{\beta_{XP2}S_P^{-\rho_{XP2}} + (1-\beta_{XP2})K_P^{-\rho_{XP2}}\}^{-\frac{1}{\rho_{XP2}}} \tag{A12}$$

$$X_P = \alpha_{TP}\{\beta_{TP}E_P^{\rho_{TP}} + (1-\beta_{TP})D_P^{\rho_{TP}}\}^{\frac{1}{\rho_{TP}}} \text{ (solved for } D_P) \tag{A13}$$

$$X_{AN} = D_{AN} \tag{A14}$$

[14]Unless otherwise indicated, the indices i and j refer to production sectors AN, AT, I, P, G.

EMPLOYMENT

$$U_R = U_{R,-1}(1+g_R) - MIG \tag{A15}$$

$$U^d_{AT} = \left(V_{AT}^{1+\frac{\rho_{XAT}}{1-\eta_{XAT}}} \frac{1-\eta_{XAT}}{w_{AT}} \cdot \frac{\beta_{XAT}}{\alpha^{\rho_{XAT}}_{XAT}}\right)^{\frac{1}{1+\rho_{XAT}}}, \quad \text{where } w_{AT} = \frac{W_A}{PV_{AT}} \tag{A16}$$

$$U^d_{AN} = \left(V_{AN}^{1+\frac{\rho_{XAN}}{1-\eta_{XAN}}} \frac{1-\eta_{XAN}}{\omega_{AN}} \cdot \frac{\beta_{XAN}}{\alpha^{\rho_{XAN}}_{XAN}}\right)^{\frac{1}{1+\rho_{XAN}}}, \quad \text{where } \omega_{AN} = \frac{W_A}{PV_{AN}} \tag{A17}$$

$$U_R = U^d_{AN}(V_{AN}, \frac{W_A}{PV_{AN}}) + U^d_{AT}(V_{AT}, \frac{W_A}{PV_{AT}}) \tag{A18}$$

$$U^d_P = T_1 \left(\frac{1}{(1+ptax_U)\omega_M} \frac{\beta_{XP1}}{\alpha^{\rho_{XP1}}_{XP1}}\right)^{\sigma_{XP1}}, \text{ where } \omega_M = \frac{W_M}{PT_1} \tag{A19}$$

$$\frac{\Delta U^s_F}{U_{U,-1}} = \beta_F \left[\sigma_F \ln\left(\frac{U^d_{P,-1}}{U^s_{F,-1} - U_{G,-1}} \frac{W_{M,-1}}{W_{I,-1}}\right)\right] + (1-\beta_F)\frac{\Delta U^s_{F-1}}{U_{U,-2}} \tag{A20}$$

$$U_U = U_{U,-1}(1+g_U) + MIG - SKL - IMIG \tag{A21}$$

$$U^s_I = U_U - U^s_F \tag{A22}$$

$$U^d_I = \beta_{XI}(V_I/w_I) \tag{A23}$$

$$S^d_P = T_2\kappa_S \left(\frac{1}{(1+ptax_S)\omega_S} \cdot \frac{\beta_{XP2}}{\alpha^{\rho_{XP2}}_{XP2}}\right)^{\sigma_{XP2}}, \quad \text{where } \omega_S = \frac{W_S}{PT_2} \tag{A24}$$

$$S = (1-\delta_S)S_{-1} + SKL \tag{A25}$$

$$UNEMP_S = 1 - \frac{(S_G + S^d_P)}{S} \tag{A26}$$

$$UNEMP_U = 1 - \frac{(U_G + U^d_P)}{U^s_F} \tag{A27}$$

$$W_M = \overline{w}_M(PLEV)^{ind_M} \tag{A28}$$

$$W_I = \beta_{XI}(\frac{PV_I \cdot V_I}{U^s_I}) \tag{A29}$$

$$W_{UG} = \omega_{UG} \cdot PLEV^{ind_{UG}}, \quad W_M = \omega_M \cdot PLEV^{ind_M} \tag{A30}$$

$$W_S = P_{US} \frac{UNEMP_S^{-\phi_1} (f_S / P_{US})^{-\phi_2} \omega_{SG}^{\phi_3}}{1 - \nu/(1-\nu)\sigma_{XP2}} \tag{A31}$$

$$W_{SG} = \omega_{SG} P_{US}^{ind_{SG}} \tag{A32}$$

$$\frac{MIG}{U_{R,-1}} = \lambda_m \left[\sigma_M \ln \left(\frac{Ew_U}{Ew_A} \right) \right] + (1 - \lambda_m) \frac{MIG_{-1}}{U_{R,-2}} \tag{A33}$$

$$Ew_U = \frac{\theta_U W_{M,-1} + (1 - \theta_U) W_{I,-1}}{P_{UU,-1}} \tag{A34}$$

$$\theta_U = \frac{U^d_{P,-1}}{U^s_{F,-1} - U_{G,-1}} \tag{A35}$$

$$Ew_A = \frac{W_{A,-1}}{P_{R,-1}} \tag{A36}$$

$$\frac{IMIG}{U_{U,-1}} = \lambda_{im} \left[\sigma_{IM} \ln \left(\frac{Ew_F}{Ew_U} \right) \right] + (1 - \lambda_{im}) \frac{IMIG_{-1}}{U_{U,-2}} \tag{A37}$$

$$Ew_F = \frac{ER \cdot W_{F,-1}}{P_{UU,-1}} \tag{A38}$$

$$SKL = \lambda_S \left[\kappa_e \left(\frac{Ew_S}{Ew_U} \right)^{\sigma_W} (K_{E,-1})^{\sigma_E} \right] + (1 - \lambda_S) SKL_{-1} \tag{A39}$$

$$Ew_S = \theta_S \frac{W_{S,-1}}{P_{US,-1}} \tag{A40}$$

$$\theta_S = \frac{S^d_{P,-1}}{S_{-1} - S_{G,-1}} \tag{A41}$$

SUPPLY AND DEMAND

$$INT_j = \sum_i a_{ji} X_i \tag{A42}$$

$$Q^s_{AN} = \alpha_{QA} \{ \beta_{QA} M_{AN}^{-\rho_{QA}} + (1 - \beta_{QA}) D_{AN}^{-\rho_{QA}} \}^{-\frac{1}{\rho_{QA}}} \tag{A43}$$

$$Q^s_I = X_I \tag{A44}$$

$$Q^s_G = X_G \tag{A45}$$

$$Q^s_P = \alpha_{QP} \{ \beta_{QP} M_P^{-\rho_{QP}} + (1 - \beta_{QP}) D_P^{-\rho_{QP}} \}^{-\frac{1}{\rho_{QP}}} \tag{A46}$$

$$Q^d_{AT} = C_{AT} + G_{AT} + INT_{AT} \text{ (solved for } Q^d_{AT}) \tag{A47}$$

$$Q^d_{AN} = C_{AN} + G_{AN} + INT_{AN} \tag{A48}$$

$$Q^d_I = C_I + INT_I \text{ (solved for } C_I) \tag{A49}$$

$$Q^d_G = C_G + G_G + Z^G_P + INT_G \text{ (solved for } C_G) \tag{A50}$$

$$Q^d_P = C_P + G_P + (Z^P_P + Z_G) + INT_P \tag{A51}$$

$$C_{AN} = \sum_h x_{ANh} + \frac{\sum_h cc_{ANh}(CON_h - \sum_i PQ_i x_{ih})}{PQ_{AN}} \tag{A52}$$

$$C_P = \sum_h x_{Ph} + \frac{\sum_h cc_{Ph}(CON_h - \sum_i PQ_i x_{ih})}{PQ_P} \tag{A53}$$

$$G_j = gg_j \frac{NG}{PQ_j}, \qquad \sum gg_j = 1, \text{ for } j = AN, AT, G, P \tag{A54}$$

$$Z^j_P = zz_j \frac{PK \cdot Z_P}{PQ_i}, \qquad \sum zz_j = 1, \text{ for } j = G, P \tag{A55}$$

TRADE

$$E_{AT} = X_{AT} - (C_{AT} + G_{AT} + INT_{AT}) \tag{A56}$$

$$E_P = D_P \left(\frac{PE_P}{PD_P} \frac{1 - \beta_{TP}}{\beta_{TP}} \right)^{\sigma_{TP}} \tag{A57}$$

$$M_{AN} = D_{AN} \left(\frac{PD_{AN}}{PM_{AN}} \cdot \frac{\beta_{QA}}{1 - \beta_{QA}} \right)^{\sigma_{QA}} \tag{A58}$$

$$M_P = D_P \left(\frac{PD_P}{PM_P} \cdot \frac{\beta_{QP}}{1 - \beta_{QP}} \right)^{\sigma_{QP}} \tag{A59}$$

PRICES

$$PV_i = V_i^{-1} \left\{ PX_i(1 - indtax_i) - \sum_j a_{ji} PQ_j \right\} X_i \tag{A60}$$

$$PE_{AT} = wpe_A \cdot ER \tag{A61}$$

$$PE_P = wpe_P \cdot ER \tag{A62}$$

$$PM_{AN} = wpm_{AN}(1 + tm_{AN})ER \tag{A63}$$

$$PM_P = wpm_P(1 + tm_P)ER \tag{A64}$$

$$PX_{AN} = PD_{AN} \tag{A65}$$

$$PX_{AT} = PE_{AT} \tag{A66}$$

$$PX_i = (1 - ac_i)^{-1} \cdot \left\{ \frac{\sum_h cc_{ih} COND_h}{C_i} \right\}, \quad i = I, G \tag{A67}$$

$$COND_h = CON_h - \sum_i PQ_i x_{ih}, \quad i = I, G \tag{A68}$$

$$ac_i = \frac{\sum_h PQ_i x_{ih}}{PQ_i C_i} = \frac{\sum_h x_{ih}}{C_i}, \quad i = I, G \tag{A69}$$

$$PQ_{AN} = \frac{PD_{AN} D_{AN} + PM_{AN} M_{AN}}{Q_{AN}} \tag{A70}$$

$$PX_P = \frac{PD_P D_P + PE_P E_P}{X_P} \tag{A71}$$

$$PQ_P = \frac{PD_P D_P + PM_P M_P}{Q_P^d} \tag{A72}$$

$$PQ_i = PX_i = PD_i, \text{ for } i = I, G \tag{A73}$$

$$P_R = \sum_i wr_i PQ_i, \ \sum_i wr_i = 1 \tag{A74}$$

$$P_{UU} = \sum_i wu_i PQ_i, \ \sum_i wu_i = 1 \tag{A75}$$

$$P_{US} = \sum_i ws_i PQ_i, \ \sum_i ws_i = 1 \tag{A76}$$

$$PT_1 = \frac{T_2 PT_2 + (1 + ptax_U) W_M U_P}{T_1} \tag{A77}$$

$$PT_2 = \frac{PROF_P + (1 + ptax_S) W_S S_P}{T_2} \tag{A78}$$

$$PK = \frac{\sum_i PQ_i Z_i}{Z} = \frac{PQ_G Z_P^G + PQ_P Z_P^P}{Z} \tag{A79}$$

INCOME

$$PROF_{AN} = PV_{AN} V_{AN} - W_A U_{AN} \tag{A80}$$

$$PROF_{AT} = PV_{AT} V_{AT} - W_A U_{AT} \tag{A81}$$

$$PROF_I = PV_I V_I - W_I U_I \tag{A82}$$

$$PROF_P = PV_P V_P - (1 + ptax_U) W_M U_P - (1 + ptax_S) W_S S_P - FC \tag{A83}$$

$$FC = f_U \max(0, U_{P,-1} - U_P) + f_S \max(0, S_{P,-1} - S_P), \tag{A84}$$

$$YF_{AN} = PROF_{AN} \tag{A85}$$

$$YF_{AT} = PROF_{AT} \tag{A86}$$

$$YF_I = PROF_I \tag{A87}$$

$$YF_P = (1 - inctax_F) PROF_P - IF \cdot ER \cdot FL_{P,-1} \tag{A88}$$

$$YH_{AN} = YF_{AN} + W_A U_{AN} + \gamma_{AN} TRH \tag{A89}$$

$$YH_{AT} = W_A U_{AT} + \gamma_{AT} TRH \tag{A90}$$

$$YH_I = YF_I + W_I U_I + \gamma_I TRH + \tau_I ER \cdot REMIT \tag{A91}$$

$$\begin{aligned} YH_{UF} \;=\; & \gamma_{UF} TRH + (W_M U_P + W_{UG} U_G) \\ & + f_U \max(0, U_{P,-1} - U_P) + (1 - \tau_I) ER \cdot REMIT \end{aligned} \tag{A92}$$

$$YH_S = (W_S S_P + W_{SG} S_G) + f_S \max(0, S_{P,-1} - S_P) + \gamma_S TRH \tag{A93}$$

$$YH_{KAP} = YF_{AT} + (1 - re) YF_P + \gamma_{KAP} TRH \tag{A94}$$

$$SAV_h = savrate_h YH_h (1 - inctax_h) \tag{A95}$$

$$CON_h = (1 - inctax_{h)} YH_h - SAV_h \tag{A96}$$

$$PK \cdot Z_P + PQ_P Z_G = re \cdot YF_P + \sum_h SAV_h - CDEF + ER(\Delta FL_P + \Delta FL_G) \tag{A97}$$

$$K_P = (1 - \delta_P) K_{P,-1} + Z_{P,-1} \tag{A98}$$

PUBLIC SECTOR

$$-CDEF = TXREV - TRH - NG - IF_G ER \cdot FL_{G,-1} \tag{A99}$$

$$-ODEF = -CDEF - PQ_P Z_G \tag{A100}$$

$$\begin{aligned} TXREV \;=\; & \sum_{i=AN,P} wpm_i tm_i M_i ER + \sum_i indtax_i PX_i X_i \\ & + inctax_{KAP} YH_{KAP} + inctax_r (YH_{AT} + YH_{AN}) \\ & + inctax_{UU} (YH_{UF} + YH_S) + ptax_U W_M U_P \\ & + ptax_S W_S S_P + inctax_F PROF_P \end{aligned} \tag{A101}$$

$$Z_G = I_{INF} + I_E + I_H \tag{A102}$$

$$K_i = K_{i,-1}(1-\delta_i) + I_{i,-1},\ i = INF, H, E \tag{A103}$$

$$K_G = \alpha_G\{\beta_G K_{INF}^{-\rho_G} + (1-\beta_G)K_H^{-\rho_G}\}^{-\frac{1}{\rho_G}} \tag{A104}$$

BALANCE OF PAYMENTS

$$\begin{aligned} 0 \;=\; & \sum_i (wpe_i E_i - wpm_i M_i) \\ & + REMIT - IF \cdot FL_{P,-1} - IF_G FL_{G,-1} \\ & + \Delta FL_P + \Delta FL_G \end{aligned} \tag{A105}$$

$$REMIT = W_F FORL_{-1} \tag{A106}$$

$$FORL = (1-\delta_{IMIG})FORL_{-1} + IMIG \tag{A107}$$

Appendix B
Variable Names and Definitions

Endogenous Variables[15]

$CDEF$	Current public budget deficit
D_P	Domestic demand for domestic private urban good
E_i	Export of traded goods for $i = AT, P$
Ew_U	expected urban unskilled wage
Ew_A	expected agricultural wage
Ew_S	expected skilled wage
f_h	Firing cost per skilled worker for $h = S, U$
FC	Total firing costs
$FORL$	Stock of domestic workers abroad
G_i	Government spending on good $i = AN, AT, G, P$
$IMIG$	International migration
INT_i	Intermediate good demand for good i
K_E	Public capital in education
K_G	Total public capital
K_H	Public capital in health
K_{INF}	Public capital in infrastructure
K_P	Private capital
M_i	Import of good $i = AN, P$
MIG	Migration to urban area
$ODEF$	Overall budget deficit
P_R	Rural price index
PD_i	Domestic price of domestic sales of good $i = AN, P$
PE_i	Price of exported good $i = AT, P$
PK	Price of capital
$PLEV$	Overall consumer price index
PM_i	Price of imported good $i = AN, P$
PQ_i	Composite good price of good i
$PROF_i$	Profits by firms in sector $i = AN, AT, I, P$
PT_1	Price of composite input T_1
PT_2	Price of composite input T_2

[15]The index i (respectively, h) is used below to refer to all production sectors (household groups, respectively), that is, AN, AT, I, P, G ($AN, AT, R, KAP, I, UU, UF, S$, respectively), unless otherwise indicated.

P_h	Price index for household $h = US, UU$
PV_i	Value added price of good i
PX_i	Sales price of good i
Q_i^s, Q_i^d	Composite supply and demand of good i
$REMIT$	Foreign-currency value of the flow of remittances from abroad
S	Skilled workers
S_P	Skilled workers in private urban formal sector
S_P^d	Demand for skilled workers in private urban formal sector
S_P^T	Union's employment target
SAV_h	Saving by household h.
$Savrate_h$	Saving rate for household h
SKL	New skilled workers
S_P	Skilled labor employed in private urban formal
T_1	Composite input from T_2 and unskilled labor
T_2	Composite input from capital and skilled labor
TRH	Transfers to households
$TXREV$	Tax revenues
U_i	Unskilled labor employed in sector $i = AN, AT, I, P$
U_R	Unskilled workers in rural economy
U_U	Unskilled workers in urban economy
U_i^d	Demand for labor in sector $i = AN, AT, I, P$
U_F^S	Unskilled labor supply in the urban formal sector
U_I^S	Unskilled labor supply in the informal sector
$UNEMP_S$	Skilled unemployment rate
$UNEMP_U$	Unskilled unemployment rate in the formal sector
V_i	Value added in sector i
W_i	Nominal wage for labor employed in sector $i = A, I$
w_i	Real wage rate for unskilled labor employed in sector $i = AN, I$
W_M	Minimum wage (unskilled labor in urban formal private sector)
w_M	Real minimum wage (unskilled workers in urban formal private sector)
W_S	Nominal wage rate for skilled worker in the private urban formal sector

w_S	Real wage rate for skilled worker in the private urban formal sector
w_S^C	Consumption real wage for skilled labor
w_S^{CT}	Union's consumption real wage for skilled labor
W_{SG}	Nominal wage rate for skilled labor in the government sector
w_{SG}	Skilled wages in the public sector measured in terms of the relevant price index
W_{UG}	Nominal wage rate for unskilled labor in the government sector
w_{UG}	Unskilled wages in the public sector measured in terms of the relevant price index
x_{ih}	Subsistence level of consumption of good i by household h
X_i	Production of good i
YF_i	Income by firms in sector $i = AN, AT, I, P$
YH_h	Household income for household h
Z_i	Investment demand for good $i = G, P$
Z_P^i	Investment demand for good $i = P, G$ by formal private sector

Exogenous Variables

Name	Definition
ac_i	Share of autonomous consumption of good i in total consumption of good i
ER	Nominal exchange rate
Ew_F	Expected foreign wage measured in terms of the domestic price index
FL_i	Foreign loans to sector $i = G, P$
G_C	Government consumption
g_R	Population growth in rural economy
g_U	Population growth in urban economy
I_E	Real public investment in education
IF	Foreign interest rate
IF_G	Interest rate on government foreign loans
I_H	Real public investment in health
I_{INF}	Real public investment in infrastructure
$inctax_h$	Income tax rate for h
$indtax_i$	Rate of indirect taxation of output in sector i
LAN_i	Land used by sector $i = AN, AT$
NG	Total government current expenditure on goods and services
$ptax_S$	Payroll tax for skilled labor in private urban sector
$ptax_U$	Payroll tax for unskilled labor in private urban sector
S_G	Skilled workers in public sector
tm_i	Import tariff for good $i = AN, P$
U_G	Unskilled workers in public sector
w_F	Nominal foreign wage
w_{SG}	Real wage rate paid to skilled workers in public sector
wpe_i	World price of export for $i = AT, P$
wpm_i	World price of import for $i = AN, P$

Parameters

Name	Definition
a_{ij}	Input-output coefficient for $i = AN, AT, I, P, G$ and $j = AN, AT, I, P, G$
α_{TP}	Shift parameter in transformation function between exported and domestic private production
α_{Xi}	Shift parameter in production of good $i = AN, AT, I, P$
α_{XP1}	Shift parameter in composite input of unskilled and skilled/capital composite input
α_{XP2}	Shift parameter in composite input of skilled workers and private capital
β_F	Speed of adjustment for the supply of unskilled labor in the formal private sector
β_{QA}	Shift parameter in agricultural composite good
β_{QP}	Shift parameter in urban composite good
β_{TP}	Shift parameter between exported and domestic private production
β_{Xi}	Shift parameter in production of good $i = AN, AT, I, P$
β_{XP1}	Share parameter between unskilled and skilled/capital composite input
β_{XP2}	Share parameter between skilled workers and private capital
β_{hF}	Money demand elasticity on foreign rate
β_{hPINF}	Money demand elasticity on inflation
cc_{ih}	Shares of household h in consumption of good i
dco_P	Parameter in the value function of urban private formal goods
δ_E	Depreciation of education capital
δ_H	Depreciation of health capital
δ_{INF}	Depreciation of infrastructure
δ_{IMIG}	Rate of "attrition" of the stock of migrants
δ_P	Private capital's depreciation rate
δ_S	Rate of "depreciation" or"de-skilling" of the skilled labor
η_{XAN}	Coefficient of returns to scale
η_{XAT}	Coefficient of returns to scale
γ_h	Share of transfers allocated to household $h = KAP, AN, S, AT, UF, I$
gg_i	Share of government expenditure on good $i = AN, AT, G, P$

ind_m	Parameter indexing nominal wage for unskilled labor employed in private urban formal
ind_{SG}	Parameter indexing nominal wage for skilled workers in public sector
ind_{UG}	Parameter indexing nominal wage for unskilled workers in public sector
κ_e	Shift parameter in skills acquisition function
κ_S	Shift parameter for skilled private sector employment
λ_{im}	Speed of adjustment in the international migration equation
λ_m	Partial adjustment rate on migration
λ_s	Partial adjustment rate on skills acquisition
ϕ_j	Parameters determining the nominal wage rate for the skilled labor for $j = 1, 2, 3$
re	Percentage of profits retained
ρ_{TP}	Substitution parameter between exported and domestic private production
ρ_{Xi}	Substitution parameter in production of good $i = AN, AT, P$
ρ_{XP1}	Substitution parameter between unskilled and skilled/capital composite input
ρ_{XP2}	Substitution parameter between skilled workers and private capital
σ_e	Parameter in the skill equation
σ_{im}	Partial elasticity of migration flows with respect to expected wages
σ_{iu}	Partial elasticity of migration flows with respect to unskilled unemployment
σ_{QA}	Elasticity of agricultural composite good
σ_{QP}	Elasticity of private urban composite good
σ_S	Elasticity of saving rate to deposit rate
σ_{TP}	Elasticity of transformation between exported and domestic private production
σ_W	Elasticity of skills acquisition to wage differential
σ_{XP1}	Elasticity of substitution between unskilled workers and composite input of skilled workers and private capital
σ_{XP2}	Elasticity of substitution between skilled workers and private capital

τ_I	Fraction of the remittances that are allocated to households in the informal sector
θ_U	Share of urban unskilled workers employed in formal sector
θ_s	Initial ratio of the number of workers employed in the private sector
υ	Relative importance that the union attach to wage deviations as opposed to employment deviations
wr_i	Relative weight of good i in rural consumption
ws_i	Initial share of good i in skilled workers' consumption
wu_i	Initial share of good i in urban unskilled workers' consumption
zz_i	Share of investment expenditure on good $i = G, P$

Appendix C
Calibration and Parameter Values

This Appendix presents a brief overview of the characteristics of the data underlying the model's social accounting matrix (SAM) and discusses the parameter values.[16]

The basic data set consists of a SAM and a set of initial levels and lagged variables. The SAM encompasses 27 accounts including production and retail sectors (4 accounts), labor production factors and profits (3 accounts), enterprises (1 account), households (5 accounts), government current expenditures and taxes (9 accounts), government investment expenditures (3 accounts), private investment expenditures (1 account), and the rest of the world (1 account). The actual SAM data are presented in Table C1.

The characteristics of the SAM data are summarized in the following. On the output side, agricultural and informal sectors are very small accounting for respectively 3 and 11 percent of total output. In contrast, private urban formal production account for almost 75 percent of total output. On the demand side, private current expenditures account for 68 percent of GDP, while government current expenditures account for 15 percent of GDP. At the same time, total investment expenditures represent 25 percent of GDP, implying that Morocco is running a trade deficit equivalent to 8 percent of GDP.

Looking at the balance of payments, total net remittances to households and net factor income to enterprises amounts to 2 percent of GDP. The ensuing current account deficit, amounting to 6 percent of GDP, is financed equally by private and public foreign borrowing. The trade balance are dominated by non-agricultural imports and exports - agricultural exports account for only 14 percent of total export earnings, while non-agricultural imports account for 95 percent of total import expenditures. The level of trade openness, measured by the ratio of the sum of imports and exports to GDP, amounts to a moderate 44 percent.

Looking at the government budget, indirect taxes in the form of production and retail level taxes account for 62 percent of total government revenues excluding inter-government transfers. Enterprise tax revenues, amounting to

[16]The first part of this Appendix draws heavily on an unpublished note by Dr. Touhami, who built the SAM that we use for calibrating our model. A comprehensive description of the SAM is available in Touhami (2003).

18 percent of total government income, represents the largest revenue item among direct tax items, while combined factor and household taxes account for only 12 percent of revenues. Foreign borrowing accounts for the remaining 8 percent of government revenues. On the expenditure side, domestic and foreign transfers account for respectively 8 and 9 percent of the budget, while consumption and savings for investment purposes amount to respectively 40 and 42 percent of the budget. Overall, the Moroccan government relies heavily on indirect taxes for revenue collection, while maintaining almost equal proportions between consumption and saving for investment purposes.

Consider now the behavioral parameters. The elasticity of substitution of the public capital stock with the private capital-skilled labor bundle in the production of the private good, σ_{XP}, is set to zero, implying perfect complementary. The elasticities of substitution of public capital with unskilled labor in production of agricultural goods, σ_{XAN} and σ_{XAT}, are both equal to 0.75. The elasticity of substitution between unskilled labor and the capital-skilled labor bundle in the private formal sector, σ_{XP1}, is 0.7. The elasticity of substitution between skilled labor and private capital, σ_{XP2}, is 0.3. The Armington elasticities, ρ_{QA} and ρ_{QP}, are taken to be 0.25 and zero respectively. σ_{QA} and σ_{QP} are 0.8 and 1 respectively. The CET transformation elasticity, σ_{TP}, is 1, and the export demand elasticity, σ_{TP}, is also 1. The depreciation rate of private capital, δ_P, is 0.08. The congestion effect on the use of public goods in production, *dcop*, is zero. Nominal wages are fully indexed on the relevant price index. The elasticity of the skilled wage with respect to unemployment, ϕ_1, and with respect to firing costs, ϕ_2, are both equal to 0.1, whereas the elasticity with respect to the public sector wage, ϕ_3, is 0.5. The relative weight of wages in the trade union's utility function, υ, is 0.1, which indicates that the union cares more about employment than wages. The weight of relative wages in the migration equation, λ_m, is 0.3. The elasticity of migration with respect to the expected wage differential, σ_m, is 0.1. The degree of persistence in international migration flows, λ_{im}, is 0.1. The elasticity of international migration with respect to the expected wage differential, σ_{im}, is 0.1. The adjustment coefficient on skills acquisition, λ_s, is 0.1. The impact of relative wages on skills acquisition, σ_w, is 0.5. The elasticity of skills acquisition with respect to the public capital stock in education, σ_E, is 0.8273. The degree of persistence of migration flows to the formal sector, β_F, is 0.1. The elasticity of substitution between infrastructure capital and health, σ_G, is equal to 0.75. The initial share parameter for the infrastructure component, β_G, is 0.75.

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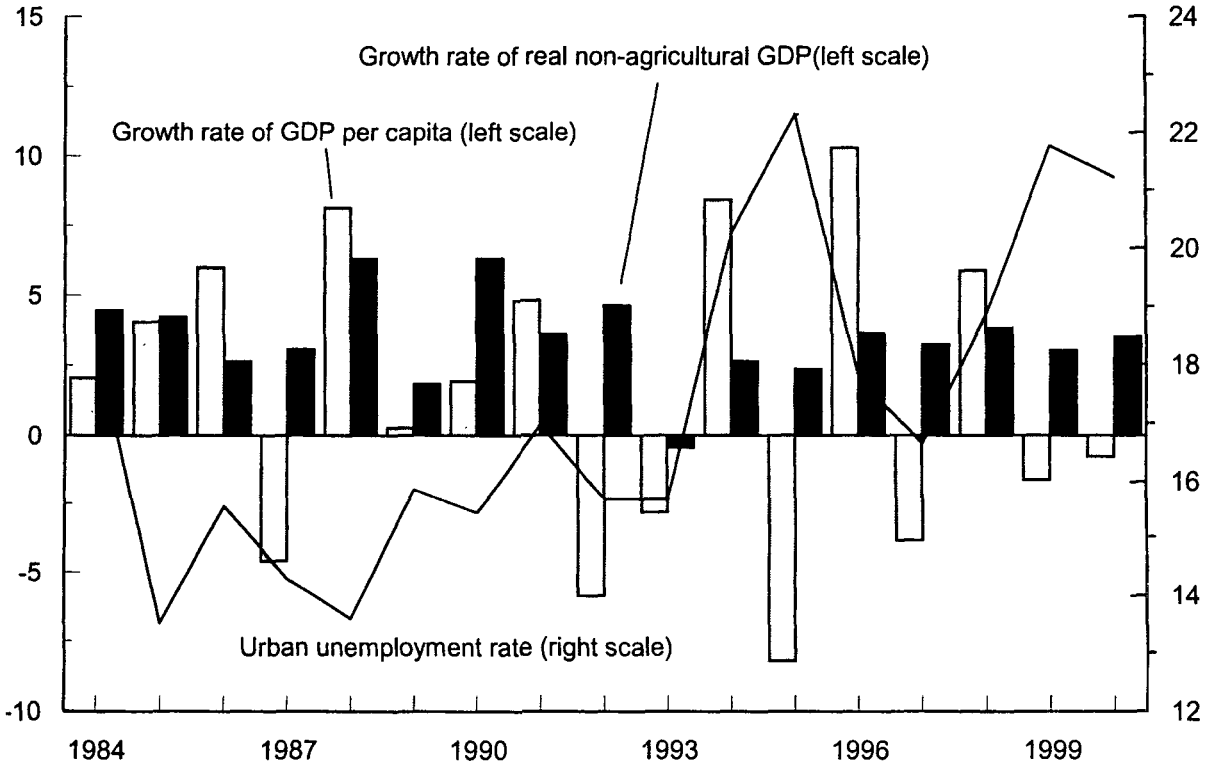
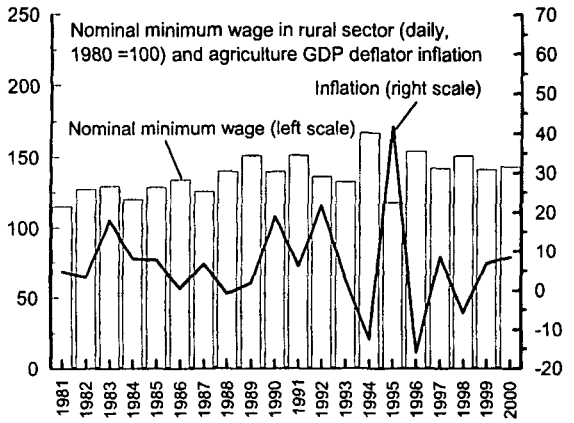
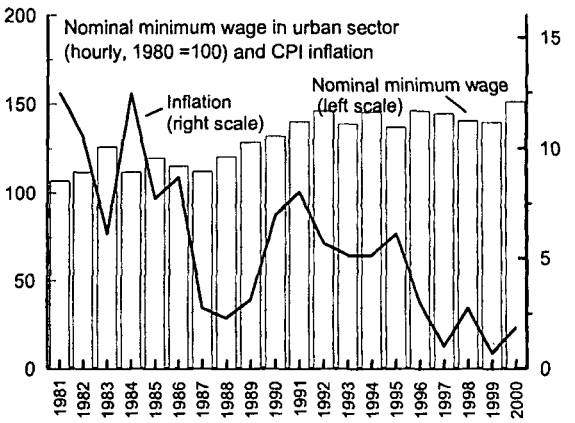
Figure 1
Morocco: Urban Unemployment Rate and Growth Rate of Real GDP per capita, 1984-2000
(in percent)

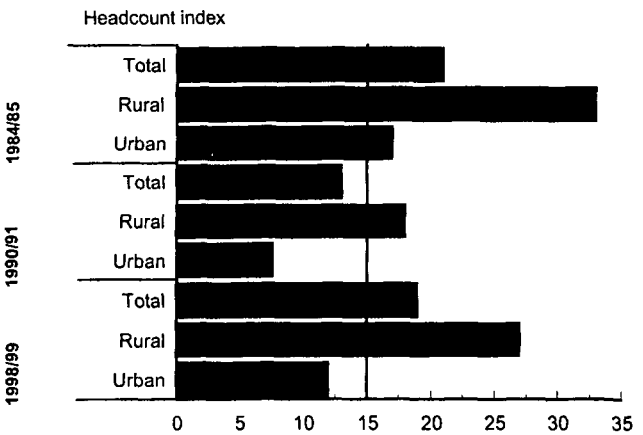


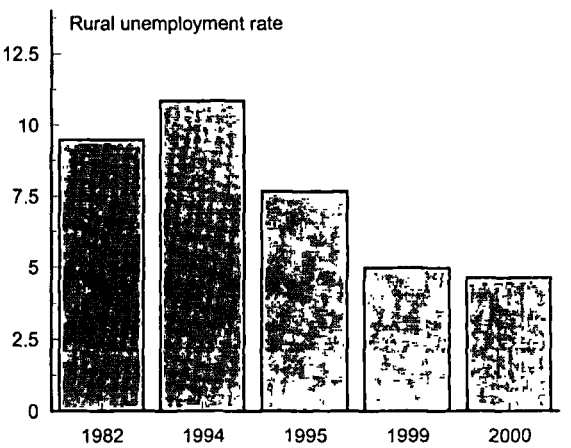
Source: Direction de la statistique and World Bank.

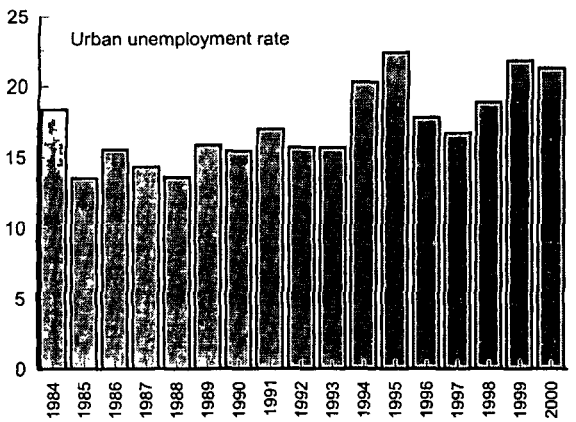
Figure 2
Morocco: Labor Market and Poverty Indicators, 1981-2000

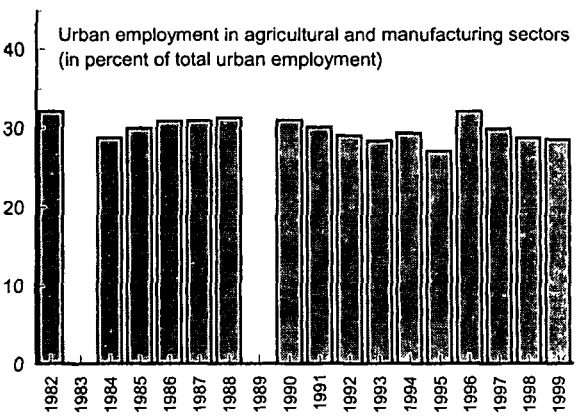






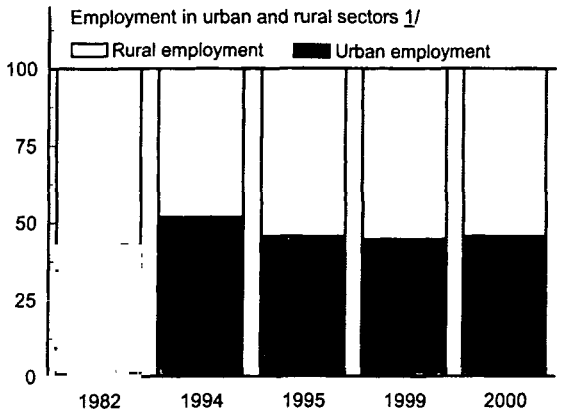


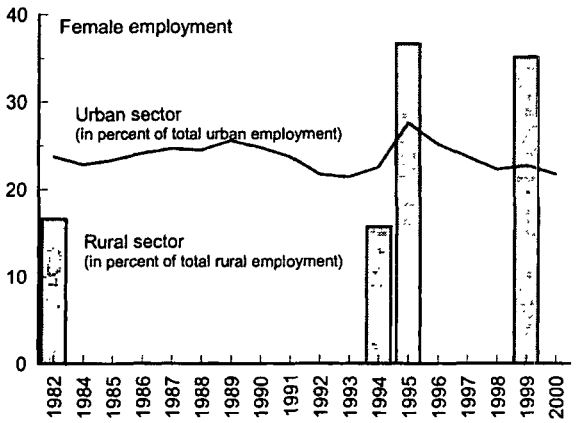


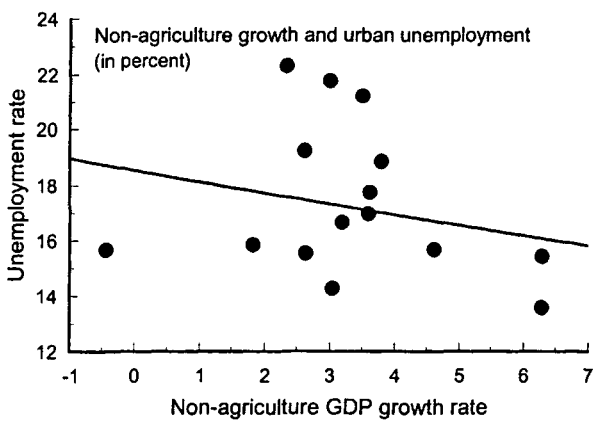


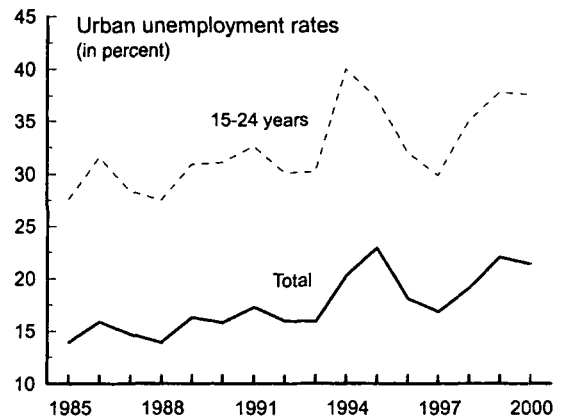
Source: Direction de la statistique.

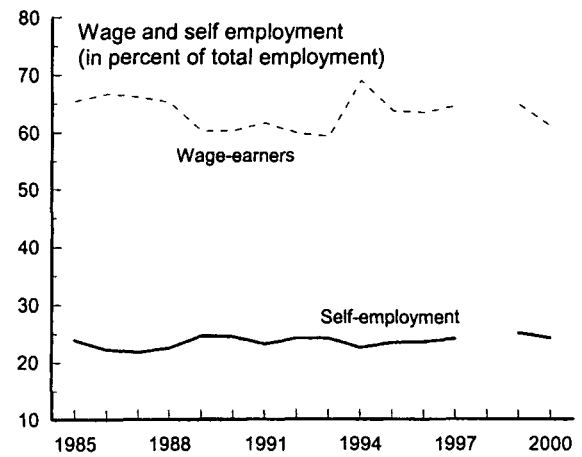
Figure 3
Morocco: Labor Market and Poverty Indicators, 1982-2000

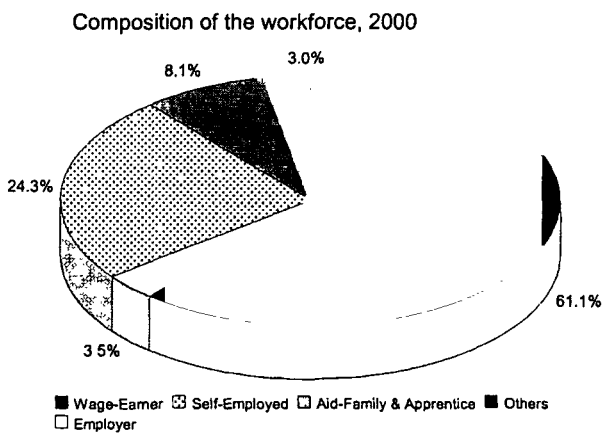








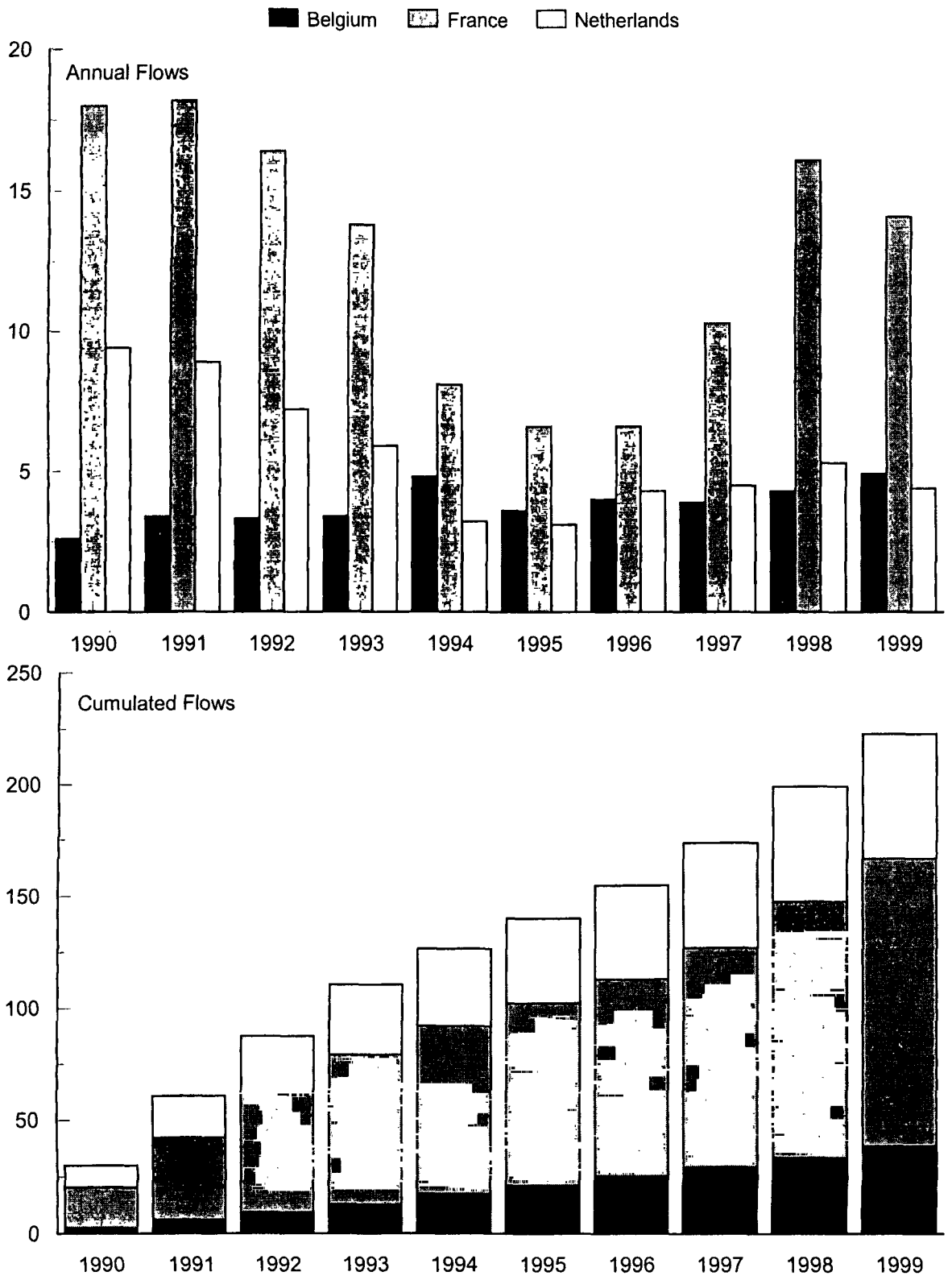




1/ In percent of total employment.

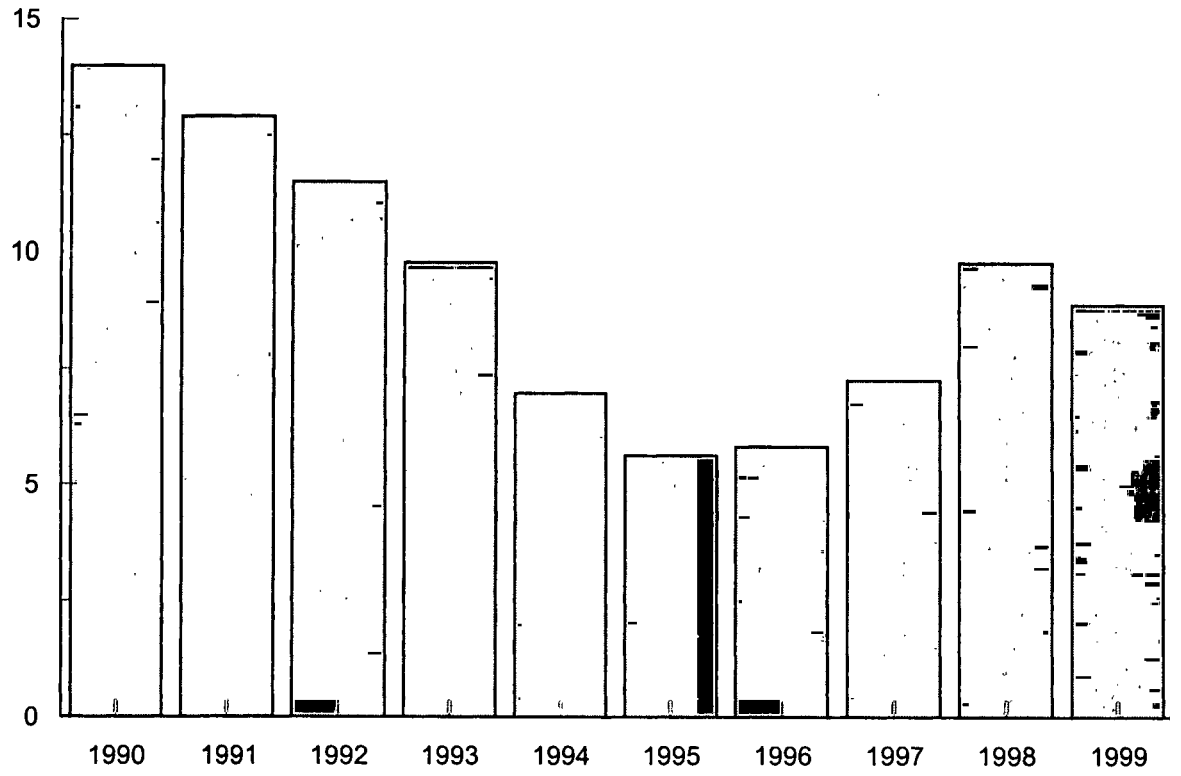
Source: Direction de la statistique.

Figure 4
Morocco: Gross Labor Inflows to Selected European Countries, 1990-99
(in thousands)



Source: OECD.

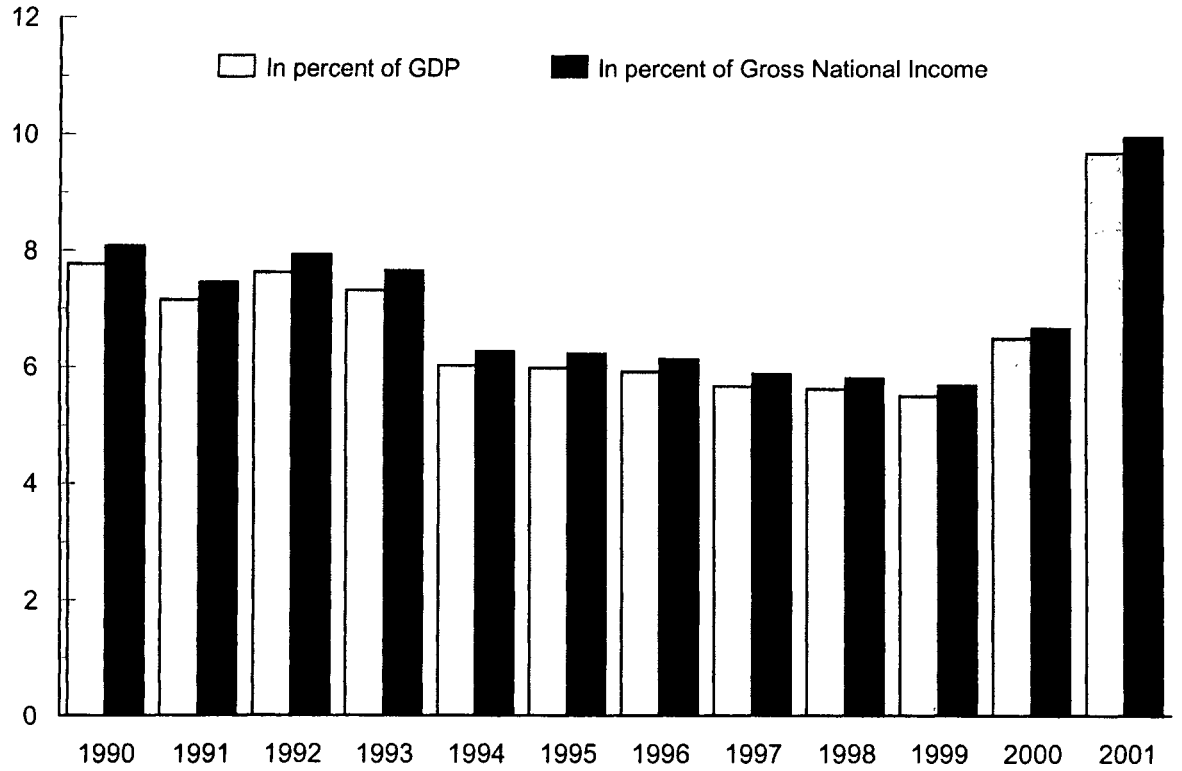
Figure 5
Morocco: Gross Labor Outflows to Selected European Countries, 1990-99 1/
(in percent of the change in the labor force in Morocco)



Source: World Bank and OECD.

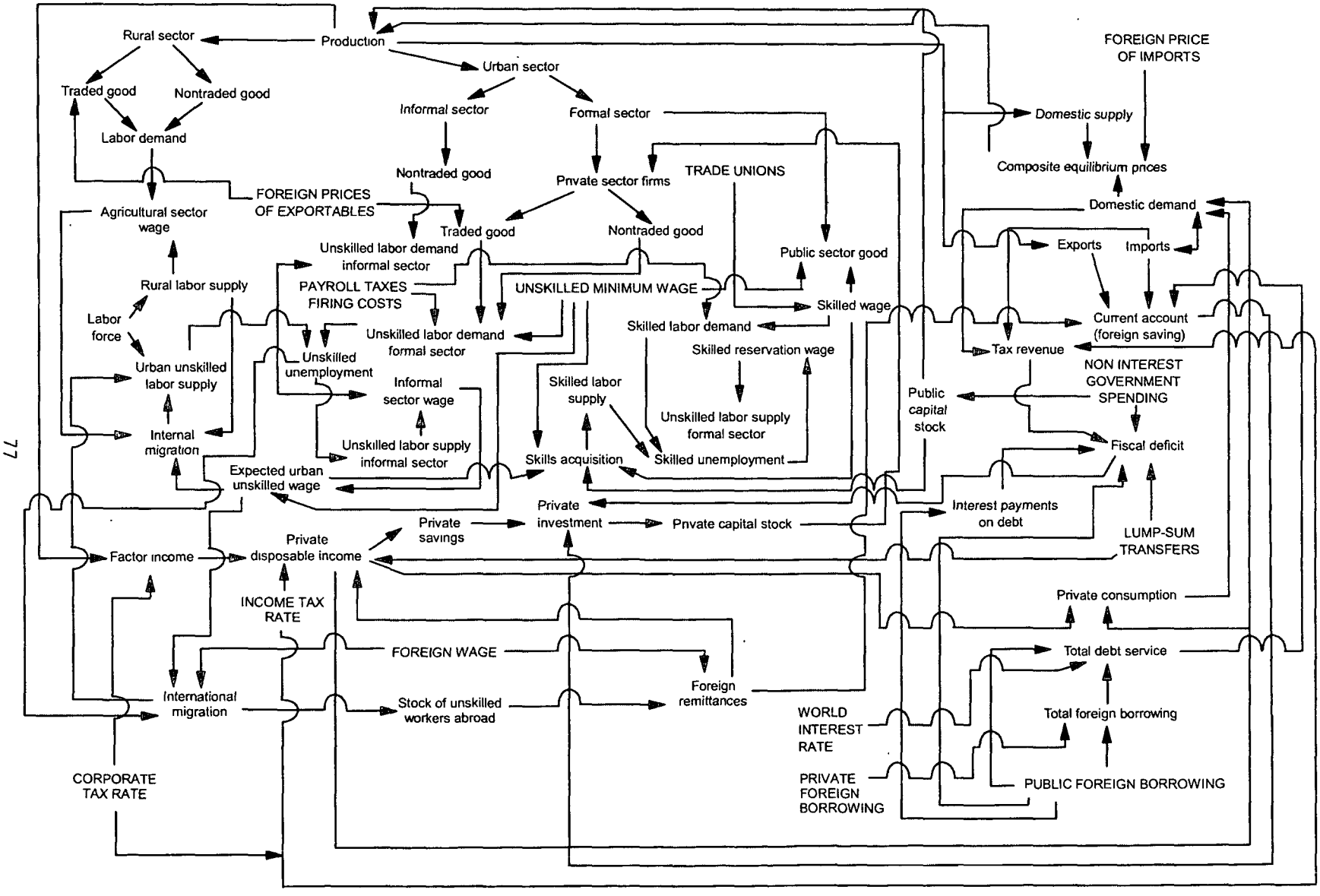
1/ Selected European countries are Belgium, France and the Netherlands.

Figure 6
Morocco: Worker Remittances from Abroad, 1990-2001



Source: Office des Changes.

Figure 7. Morocco Model: Analytical Structure



Note: Exogenous variables are in capital letters.

Table 1
Morocco: Simulation Results
5 Percent Reduction in Unskilled Labor Minimum Wage
(Percentage deviations from baseline, unless otherwise indicated)

	Periods									
	1	2	3	4	5	6	7	8	9	10
Real Sector										
Total resources	0 04	0 05	0 06	0 08	0 10	0 12	0 13	0 14	0 15	0 15
Gross domestic product	0 04	0 05	0.06	0 08	0 10	0.12	0 13	0 14	0 15	0 15
Imports of goods and NFS	0 04	0 05	0 07	0 09	0 11	0 13	0.14	0 15	0 16	0 16
Total expenditure	0 04	0 05	0.06	0.08	0 10	0.12	0.13	0.15	0 15	0 15
Total consumption	0.02	0 03	0 04	0 06	0 08	0 09	0 11	0 11	0 12	0.12
Private consumption	0 03	0 04	0 05	0 07	0.09	0 11	0 13	0 14	0 14	0 14
Public consumption	0 00	0.00	0 00	0 00	0 00	0 00	0 00	0 00	0.00	0 00
Total investment	0 06	0 07	0 09	0.12	0 15	0 17	0.19	0 20	0 20	0 20
Private investment	0 17	0 20	0 23	0.28	0.32	0 36	0 38	0 40	0 41	0 41
Public investment	-0 02	-0 02	-0 01	0 00	0 01	0 01	0 02	0 02	0 01	0 00
Exports of goods and NFS	0 06	0.07	0.10	0 12	0.14	0.17	0 19	0 21	0 22	0 23
External Sector (% of GDP)[1]										
Current account	0 00	0 00	0 00	0 00	0 00	0.00	0 00	0 00	0 00	0 00
Exports of goods and NFS	0 00	0 01	0 01	0.01	0 01	0 01	0 01	0 01	0 01	0 01
Imports of goods and NFS	0 00	0.00	0.00	0 00	0 00	0 00	0 00	0 00	0.00	0.00
Factor services	0 00	0 00	0 00	0 01	0 01	0.01	0 01	0 01	0 01	0 01
Capital account	0 00	-0 01	-0 01	-0 01	-0 01	-0 02	-0 02	-0 02	-0 02	-0.02
Private borrowing	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0.00
Public borrowing	0 00	0 00	-0 01	-0 01	-0 01	-0 01	-0.02	-0 02	-0 02	-0 02
Government Sector (% of GDP)[1]										
Total revenue	0 00	0 00	0.00	0 00	0 00	0.00	0 00	0 00	0 00	0.00
Direct taxes	0 00	0 00	0.00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
Indirect taxes	0 00	0.00	0 00	0 00	0 00	0.00	0 00	0 00	0 00	0 00
Total expenditure	-0 02	-0 02	-0.02	-0 03	-0 03	-0 04	-0 04	-0 05	-0 05	-0.05
Consumption	-0.01	-0 01	-0 01	-0 01	-0 02	-0.02	-0.02	-0 02	-0 02	-0 02
Investment	-0 01	-0 01	-0 01	-0 01	-0 02	-0 02	-0 02	-0 02	-0 02	-0 02
Transfers to households	0.00	0.00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
Foreign interest payments	0 00	0 00	0 00	0 00	0.00	0.00	0 00	0 00	0 00	0 00
Total financing	-0 02	-0 02	-0 03	-0 04	-0 04	-0 05	-0 05	-0 06	-0 06	-0.06
Foreign financing	0.00	0.00	-0 01	-0 01	-0 01	-0 01	-0 02	-0 02	-0 02	-0.02
Domestic borrowing	-0 02	-0 02	-0.02	-0 03	-0 03	-0 04	-0 04	-0 04	-0.04	-0 04
Labor Market										
Nominal wages										
Agricultural sector	0.06	0 03	-0 01	-0.08	-0 14	-0 19	-0 23	-0 25	-0.25	-0 23
Informal sector	0.04	0 24	0 57	0.95	1 33	1 66	1 91	2 04	2 06	1 97
Private formal sector										
Unskilled	-5.01	-5 00	-5 00	-4 99	-4 98	-4 98	-4 97	-4 97	-4 97	-4 97
Skilled	0.01	0 02	0 04	0 06	0 08	0 10	0 13	0 15	0.18	0 21
Public sector										
Unskilled	-0.01	0.00	0 00	0 01	0 02	0 02	0 03	0 03	0 03	0 03
Skilled	-0.01	-0 01	0 00	0 01	0 01	0 02	0.02	0 03	0 03	0 02
Employment										
Agricultural sector										
Traded	-0 02	0.00	0 05	0 10	0 15	0 20	0 24	0 26	0 27	0 26
Non-traded	0 07	0 10	0 14	0 20	0 26	0.32	0 37	0.41	0 43	0 45
Informal sector	0 00	-0.18	-0 46	-0.79	-1 12	-1 41	-1.61	-1 72	-1 73	-1 65
Private formal sector										
Unskilled	3 71	3 72	3 73	3.75	3 76	3 78	3.79	3 80	3 80	3 81
Skilled	0 02	0.03	0 04	0 05	0 06	0 08	0 08	0 09	0 09	0 09
Public sector										
Unskilled	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
Skilled	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
Labor supply (urban formal)										
Unskilled	0 00	-0 01	-0 01	-0 03	-0 05	-0 07	-0 09	-0 12	-0 15	-0.17
Skilled	0.00	0.00	0.00	0 00	0.00	0 00	0 00	0.01	0 01	0 01
Workers abroad	0 00	0 02	0 06	0.09	0 11	0.13	0 13	0.12	0.10	0 08
Unemployment rate [1]										
Unskilled	-2 38	-2 39	-2 39	-2 41	-2.43	-2 46	-2 50	-2 53	-2 57	-2 61
Skilled	-0 01	-0.02	-0 03	-0 03	-0 04	-0.04	-0 05	-0 05	-0 05	-0 05
Real wage ratios [1]										
Expected urban-rural	0 00	-0 68	-0.57	-0.40	-0 21	-0 02	0 15	0 27	0 35	0 36
Expected formal-informal	0 00	-1.98	-2 32	-2 83	-3 38	-3.84	-4.16	-4 30	-4 26	-4.07
International-expected formal	0 00	2 04	1 80	1 39	0 90	0.42	0 02	-0 26	-0 41	-0.44
Migration [1]										
Rural-urban (% of urban unskilled labor supply)	0 00	-0.05	-0 08	-0 09	-0.09	-0 07	-0 04	-0.01	0 03	0.05
Formal-informal (% of urban formal unskilled labor supply)	0 00	-0 01	-0 01	-0.01	-0 02	-0 02	-0 02	-0 03	-0 03	-0 03
International emmigration (% of urban unskilled labor supply)	0.00	0 02	0 04	0.04	0 04	0.04	0 03	0.01	0.00	0 00
Memorandum Items [2]										
GDP at market prices	0 05	0 06	0.07	0 08	0 09	0 10	0 11	0 12	0 13	0.14
Value added at factor cost	0.04	0 05	0 06	0.07	0 08	0 10	0.11	0 12	0 13	0 14
Value added in traded agricultural sector	-0 01	0.00	0 02	0.04	0 07	0 09	0.11	0 12	0 12	0 11
Value added in non-traded agricultural sector	0 02	0 02	0.03	0.05	0 06	0 07	0 08	0.09	0 10	0 10
Value added in urban informal sector	0 00	-0 01	-0 04	-0 07	-0.09	-0 12	-0 14	-0 15	-0 15	-0 14
Value added in urban formal sector	0 07	0 08	0 10	0.11	0 13	0 14	0 16	0.17	0 18	0 19
Private Consumption	0.04	0 04	0 06	0 07	0 08	0.10	0 11	0.12	0 13	0.13
Private Investment	0 19	0 22	0.25	0 29	0 32	0 35	0 38	0 40	0 41	0.42
Disposable Income	0 04	0 04	0.05	0 06	0 08	0 09	0.10	0 11	0 11	0 11

[1] Absolute deviation from base line [2] real terms

Table 2
Morocco: Prices, Income, Consumption, and Structural Indicators
5 Percent Reduction in Unskilled Labor Minimum Wage
(Absolute deviations from baseline, unless otherwise indicated)

	Periods									
	1	2	3	4	5	6	7	8	9	10
Consumer Prices and the Real Exchange Rate [1]										
Rural CPI	0 00	0 00	0.00	0 01	0 02	0.02	0 03	0.03	0.03	0 03
Urban CPI	-0.01	-0.01	0 00	0 01	0 01	0 02	0.03	0 03	0 03	0 02
Unskilled	-0 01	-0.01	0 00	0 01	0 02	0 02	0 03	0 03	0 03	0 02
Skilled	-0.01	-0 01	0 00	0 01	0.01	0.02	0.02	0 03	0 03	0 02
Real Exchange Rate	0 02	0 02	0 02	0 02	0 01	0 01	0 01	0 02	0.02	0 03
Value Added Prices [1]										
Rural traded agriculture	0 05	0.05	0 03	0.00	-0 02	-0 04	-0.05	-0 05	-0.04	-0 03
Rural non-traded agriculture	0.13	0.14	0 14	0.14	0 13	0.14	0 15	0.17	0.20	0 24
Urban private informal	0 04	0 08	0 15	0 22	0 30	0 37	0 42	0.45	0.46	0.44
Urban private formal	-0 04	-0.04	-0 04	-0 03	-0 02	-0 01	-0 01	-0 02	-0.03	-0.04
Urban public	0 01	0 01	0.01	0.01	0.01	0 01	0 01	0 01	0 01	0 02
Real Disposable Income [1]										
Rural households	0 04	0 05	0.06	0 07	0.08	0 09	0 10	0 12	0.14	0 16
Traded agriculture	0 04	0.05	0.04	0.04	0 04	0 04	0.05	0.05	0 07	0 08
Non-traded agriculture	0 04	0.05	0.07	0 08	0 10	0 12	0 14	0 16	0 18	0 20
Urban households	0 03	0.04	0.05	0 07	0 08	0 09	0.10	0.10	0 10	0 09
Informal	0 05	0 07	0 10	0.14	0 18	0.21	0.24	0 26	0.26	0 26
Formal unskilled	-0.24	-0.24	-0 22	-0.20	-0 18	-0.17	-0.16	-0 16	-0 16	-0.17
Formal skilled	0 03	0.04	0.05	0 07	0 09	0.10	0 12	0 14	0.16	0.18
Capitalists and rentiers	0 07	0 07	0 08	0.09	0.10	0 10	0 10	0 10	0.09	0.08
Real Private Consumption [1]										
Rural households	0 04	0 05	0.06	0 07	0.08	0 09	0 10	0 12	0.14	0 16
Traded agriculture	0 04	0 05	0.04	0 04	0 04	0.04	0 05	0 05	0.07	0.08
Non-traded agriculture	0.04	0.05	0.07	0.08	0.10	0 12	0.14	0 16	0 18	0 20
Urban households	0 03	0 04	0.05	0 06	0 08	0.09	0 10	0 10	0 10	0 09
Informal	0 05	0 07	0.10	0 14	0.18	0 21	0 24	0 26	0 26	0 26
Formal unskilled	-0 24	-0 24	-0 22	-0 20	-0.18	-0 17	-0 16	-0.16	-0 16	-0 17
Formal skilled	0 03	0 04	0 05	0 07	0 09	0 10	0.12	0 14	0 16	0 18
Capitalists and rentiers	0 07	0.07	0 08	0 09	0.10	0.10	0 10	0 10	0 09	0 08
Production Structure										
Size of Informal Sector (% of total output)	0.00	0.00	0.00	-0 01	-0.01	-0 01	-0 01	-0 01	-0 01	-0.01
Size of Agricultural Sector (% of total output)	-0.01	-0 01	-0 01	-0 01	0 00	0 00	0.00	0 00	0 00	-0.01
Composition of Employment										
Employment in rural sector (% of total employment)	-0 04	-0.03	-0 02	-0.01	0 00	0 01	0.02	0 02	0 02	0 02
Employment in informal sector (% of total employment)	-0 01	-0 01	-0.03	-0.04	-0.06	-0.07	-0 08	-0 08	-0.08	-0 07
Employment in informal sector (% of urban employment)	-0.01	-0.02	-0 04	-0 05	-0 07	-0 09	-0.10	-0 10	-0 10	-0.09
Employment in public sector (% of total employment)	0 00	0.00	0 00	0 00	0 00	0.00	0.00	0 00	0 00	0 00
Employment in public sector (% of urban employment)	0.00	0 00	0.00	0 00	0.00	0.00	0 00	0.00	0 00	0 00
Private Expenditures										
Consumption (% of GDP)	0.00	-0.01	-0 01	0 00	0 00	0 00	0 00	0 00	-0 01	-0 01
Consumption (% of total consumption)	0.00	0 01	0.01	0 01	0 01	0 02	0.02	0 02	0 02	0.02
Investment (% of GDP)	0.02	0 02	0 02	0 03	0 03	0 03	0 04	0 04	0 04	0 04
Investment (% of total investment)	0.05	0 05	0 06	0 07	0.08	0.08	0 09	0 10	0 10	0 10
Public Expenditures										
Consumption (% of GDP)	-0.01	-0 01	-0.01	-0.01	-0 02	-0 02	-0 02	-0.02	-0.02	-0.02
Investment (% of GDP)	-0.01	-0.01	-0 01	-0 01	-0 02	-0 02	-0 02	-0.02	-0.02	-0 02
Infrastructure (% of public investment)	0 00	0 00	0.00	0 00	0.00	0.00	0.00	0 00	0.00	0 00
Health (% of public investment)	0 00	0 00	0.00	0.00	0.00	0.00	0 00	0.00	0 00	0.00
Education (% of public investment)	0 00	0 00	0.00	0.00	0.00	0 00	0 00	0 00	0.00	0.00
Public sector wage bill (% of public expenditure)	0.00	0 00	0 00	0 00	0 00	0 00	0 00	0.01	0.01	0 01
External Sector										
Agricultural exports (% of total exports)	-0.03	-0 03	-0.02	-0 01	0 00	0 01	0.02	0.02	0 01	0 00
Imports of non-agricultural goods (% of total imports)	0.00	0.00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
External debt (% of GDP)	-0 05	-0 07	-0 10	-0.13	-0 17	-0.21	-0.25	-0 27	-0 30	-0.31
Degree of openness (total trade in % of GDP)	0 00	0 01	0 01	0 01	0.01	0 01	0 01	0 01	0 02	0 02

[1] Percentage deviations from the base line

Table 3
Morocco: Macro Indicators and the Labor Market
5 Percentage Point Reduction in Unskilled Labor Payroll Tax Rate
(Percentage deviations from baseline, unless otherwise indicated)

	Periods									
	1	2	3	4	5	6	7	8	9	10
Real Sector										
Total resources	0 03	0 01	-0 02	-0.06	-0 11	-0 15	-0 19	-0 23	-0.26	-0 28
Gross domestic product	0 03	0.01	-0 02	-0 06	-0.10	-0.15	-0 19	-0 22	-0 25	-0 28
Imports of goods and NFS	0 03	0 02	-0.02	-0.07	-0.12	-0 17	-0.21	-0.25	-0.27	-0.30
Total expenditure	0.03	0 01	-0.02	-0.06	-0.11	-0.15	-0.19	-0.23	-0.25	-0 27
Total consumption	0 06	0 04	0.02	-0 02	-0.06	-0.10	-0.13	-0 15	-0 16	-0 17
Private consumption	0 07	0 05	0.02	-0 02	-0.07	-0 12	-0 15	-0 18	-0.20	-0 21
Public consumption	0 00	0 00	0 00	0.00	0 00	0.00	0.00	0 00	0 00	0.00
Total investment	-0.07	-0.10	-0.14	-0.21	-0 28	-0 35	-0 43	-0 50	-0 57	-0 64
Private investment	-0 22	-0 31	-0 47	-0 69	-0 97	-1.27	-1 59	-1 95	-2 36	-2 88
Public investment	0 00	0.00	0.00	0.00	0 00	0 00	0 00	0 00	0.00	0 00
Exports of goods and NFS	0 03	0 02	-0.02	-0.07	-0 12	-0 17	-0 21	-0 25	-0 27	-0.30
External Sector (% of GDP)[1]										
Current account	0.00	0 00	0 01	0.01	0.02	0 02	0 03	0 02	0 02	0 01
Exports of goods and NFS	0 00	0 00	0.00	0.00	0 00	0 00	-0 01	-0 01	-0 02	-0 02
Imports of goods and NFS	0 00	0 00	0 00	0.00	0 00	-0 01	-0 01	-0 01	-0 01	-0 01
Factor services	0 00	0 00	0.00	-0.01	-0 02	-0 02	-0 02	-0.03	-0 02	-0 02
Capital account	0 00	0.00	0.00	0 01	0 01	0 02	0 02	0 03	0 03	0.04
Private borrowing	0 00	0.00	0 00	0 00	0 00	0 00	0 01	0.01	0 01	0 01
Public borrowing	0 00	0 00	0.00	0.00	0 01	0.01	0 02	0 02	0.03	0 03
Government Sector (% of GDP)[1]										
Total revenue	-0 04	-0 04	-0 03	-0 03	-0 03	-0 03	-0 03	-0 04	-0 04	-0 05
Direct taxes	0.00	0 01	0 01	0 01	0 01	0 01	0 01	0 01	0 01	0 00
Indirect taxes	-0 04	-0 04	-0 04	-0 04	-0.04	-0.04	-0 05	-0.05	-0.05	-0 05
Total expenditure	-0 01	-0.01	0 01	0 02	0 04	0.06	0.07	0.09	0 10	0 11
Consumption	0.00	0 00	0 00	0 01	0 02	0.03	0.03	0 04	0 05	0 05
Investment	-0 01	0 00	0.00	0.01	0 02	0 03	0 03	0.04	0 05	0 05
Transfers to households	0 00	0 00	0 00	0 00	0 00	0.00	0 00	0 00	0 01	0 01
Foreign interest payments	0.00	0 00	0 00	0.00	0 00	0 00	0 00	0 00	0 00	0.00
Total financing	0 02	0.03	0.04	0.06	0 08	0 10	0 12	0 14	0 16	0.18
Foreign financing	0 00	0 00	0.00	0 00	0 01	0 01	0 02	0 02	0 03	0.03
Domestic borrowing	0 02	0 03	0 04	0 05	0 07	0 09	0 10	0 12	0 13	0 15
Labor Market										
Nominal wages										
Agricultural sector	0 05	0 11	0.22	0 35	0 48	0 58	0 64	0.65	0 60	0.51
Informal sector	0 00	-0.47	-1.22	-2.06	-2.88	-3.57	-4.05	-4.29	-4 28	-4 05
Private formal sector										
Unskilled	-0 01	-0.02	-0 03	-0.05	-0 07	-0 09	-0 10	-0 09	-0 07	-0 04
Skilled	0 00	-0.01	-0.04	-0.07	-0.10	-0.12	-0.14	-0.14	-0 14	-0 12
Public sector										
Unskilled	-0 01	-0.02	-0.03	-0 05	-0 07	-0 09	-0 10	-0 09	-0 07	-0.04
Skilled	-0.01	-0.02	-0 03	-0 05	-0 07	-0.09	-0 09	-0 09	-0.07	-0.04
Employment										
Agricultural sector										
Traded	-0.02	-0 07	-0.17	-0.28	-0.39	-0.49	-0 56	-0 60	-0 60	-0 56
Non-traded	0.08	0.04	-0.04	-0.13	-0.24	-0.35	-0 46	-0 56	-0 66	-0 76
Informal sector	0.00	0 42	1.09	1 86	2 61	3 23	3 67	3.87	3.82	3 55
Private formal sector										
Unskilled	3.36	3.35	3 32	3.30	3.26	3.22	3 18	3.13	3 08	3 02
Skilled	0.02	0 01	0 00	-0 03	-0.06	-0 09	-0 14	-0 19	-0.25	-0.33
Public sector										
Unskilled	0 00	0 00	0.00	0.00	0 00	0.00	0 00	0 00	0.00	0.00
Skilled	0.00	0 00	0.00	0 00	0.00	0 00	0 00	0 00	0 00	0.00
Labor supply (urban formal)										
Unskilled	0 00	0 01	0.03	0 06	0 10	0.14	0 20	0 25	0 31	0.37
Skilled	0 00	0.00	0 00	0 00	-0 01	-0.01	-0 01	-0 01	-0 01	-0 01
Workers abroad	0 00	-0 05	-0 12	-0 18	-0.23	-0 26	-0 25	-0 23	-0 18	-0.13
Unemployment rate [1]										
Unskilled	-2.00	-1 95	-1 89	-1.81	-1.73	-1 63	-1.53	-1 43	-1.33	-1.22
Skilled	-0.01	-0.01	0 00	0 01	0 02	0.04	0.06	0.09	0 11	0 14
Real wage ratios [1]										
Expected urban-rural	0.00	1.45	1 20	0 82	0 39	-0 03	-0 38	-0 63	-0 75	-0.75
Expected formal-informal	0.00	4 06	4 91	6.18	7.53	8.70	9 51	9.88	9 80	9 35
International-expected formal	0.00	-4.85	-4 37	-3 46	-2 35	-1 25	-0 30	0 37	0 73	0.79
Migration [1]										
Rural-urban (% of urban unskilled labor supply)	0.00	0.11	0 18	0 19	0.17	0.12	0 06	-0 02	-0.09	-0.15
Formal-informal (% of urban formal unskilled labor supply)	0 00	0 01	0 02	0 03	0 04	0 05	0 05	0 06	0 06	0 05
International emmigration (% of urban unskilled labor supply)	0 00	-0 06	-0.09	-0.10	-0 10	-0.08	-0 06	-0 04	-0.02	0 00
Memorandum Items [2]										
GDP at market prices	0.04	0.03	0 02	0 01	-0.01	-0 04	-0 07	-0.11	-0 16	-0.21
Value added at factor cost	0 04	0 03	0 02	0.00	-0.02	-0 05	-0 08	-0.12	-0 16	-0 21
Value added in traded agricultural sector	-0 01	-0.03	-0 07	-0 12	-0 17	-0 21	-0 23	-0.25	-0 25	-0 23
Value added in non-traded agricultural sector	0 02	0 01	-0.01	-0 03	-0 05	-0.08	-0 10	-0.12	-0.14	-0.17
Value added in urban informal sector	0.00	0 03	0.09	0.15	0.21	0 27	0 30	0.32	0 31	0 29
Value added in urban formal sector	0 07	0 05	0 04	0.02	-0 02	-0 06	-0.11	-0.17	-0.24	-0 33
Private Consumption	0 08	0 07	0 05	0 03	0.00	-0.03	-0 06	-0 09	-0 12	-0.16
Private Investment	-0 20	-0 27	-0 41	-0 62	-0.87	-1.17	-1 51	-1.91	-2.39	-3 01
Disposable income	0.08	0 07	0 05	0.03	0.00	-0 03	-0 06	-0 09	-0.13	-0 16

[1] Absolute deviation from base line [2] real terms

Table 4
Morocco: Prices, Income, Consumption, and Structural Indicators
5 Percentage Point Reduction in Unskilled Labor Payroll Tax Rate
(Absolute deviations from baseline, unless otherwise indicated)

	Periods									
	1	2	3	4	5	6	7	8	9	10
Consumer Prices and the Real Exchange Rate [1]										
Rural CPI	-0.01	-0.01	-0.03	-0.05	-0.06	-0.08	-0.09	-0.08	-0.07	-0.04
Urban CPI	-0.01	-0 02	-0.03	-0.05	-0 07	-0.09	-0.09	-0.09	-0.07	-0.04
Unskilled	-0.01	-0 02	-0 03	-0.05	-0 07	-0.09	-0 09	-0.09	-0 07	-0 04
Skilled	-0.01	-0.02	-0.03	-0.05	-0.07	-0.09	-0.09	-0.09	-0.07	-0.04
Real Exchange Rate	0.02	0.03	0.04	0.06	0.07	0.08	0.08	0 06	0.02	-0.03
Value Added Prices [1]										
Rural traded agriculture	0.05	0.07	0.11	0.16	0.21	0.23	0.24	0.21	0.16	0.08
Rural non-traded agriculture	0.15	0.16	0.19	0.22	0.24	0.22	0 17	0.07	-0.07	-0.27
Urban private informal	0.00	-0.09	-0.24	-0.41	-0.59	-0.74	-0.86	-0.94	-0.97	-0.97
Urban private formal	-0 04	-0.05	-0.07	-0.10	-0.12	-0.13	-0.12	-0.10	-0.05	0.03
Urban public	0 01	0.01	0.02	0 03	0.03	0.03	0.03	0.02	0 01	-0 02
Real Disposable Income [1]										
Rural households	0.04	0.04	0.03	0.03	0.02	0.00	-0.04	-0 08	-0.13	-0.20
Traded agriculture	0.04	0.04	0.06	0 07	0.07	0.07	0 05	0.01	-0.05	-0.13
Non-traded agriculture	0.04	0.03	0.02	0.00	-0.02	-0.05	-0 09	-0.13	-0.18	-0.24
Urban households	0.10	0.09	0.06	0 03	0.00	-0 04	-0.07	-0.10	-0.12	-0.15
Informal	0.01	-0.03	-0.10	-0.18	-0 27	-0.35	-0.43	-0.49	-0.54	-0.56
Formal unskilled	0.54	0.53	0.50	0.45	0.40	0.35	0.32	0.30	0.29	0.28
Formal skilled	0.02	0.01	0 00	-0.02	-0.05	-0.08	-0.11	-0 14	-0.18	-0.22
Capitalists and rentiers	0.07	0 06	0 04	0 02	-0.01	-0.04	-0.07	-0.10	-0.12	-0.15
Real Private Consumption [1]										
Rural households	0.04	0 04	0.03	0.03	0 02	0.00	-0.03	-0.08	-0.13	-0.20
Traded agriculture	0.04	0.04	0.06	0.07	0.07	0.07	0.05	0.01	-0 05	-0.13
Non-traded agriculture	0.04	0.03	0.02	0.00	-0.02	-0 05	-0.09	-0.13	-0.18	-0.24
Urban households	0.10	0 09	0.07	0.04	0.00	-0.03	-0 06	-0.09	-0.12	-0.15
Informal	0.01	-0.03	-0.10	-0.18	-0.27	-0.35	-0.43	-0.49	-0 54	-0 58
Formal unskilled	0.54	0.53	0.50	0.45	0.40	0.35	0 32	0.30	0.29	0.28
Formal skilled	0.02	0.01	0.00	-0.02	-0.05	-0.08	-0.11	-0.14	-0.18	-0.22
Capitalists and rentiers	0.07	0.06	0.04	0.02	-0.01	-0.04	-0.07	-0.10	-0.12	-0.15
Production Structure										
Size of Informal Sector (% of total output)	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.02
Size of Agricultural Sector (% of total output)	-0.01	-0.01	-0 01	-0.02	-0.02	-0.02	-0.02	-0 01	-0.01	0.00
Composition of Employment										
Employment in rural sector (% of total employment)	-0.03	-0.05	-0.07	-0.09	-0.12	-0.14	-0.15	-0.15	-0.14	-0.13
Employment in informal sector (% of total employment)	-0.01	0.01	0.04	0 08	0.11	0.14	0.16	0.16	0.16	0.15
Employment in informal sector (% of urban employment)	-0 01	0.01	0.05	0.09	0.14	0.17	0.19	0.20	0.20	0.19
Employment in public sector (% of total employment)	0.00	0 00	0 00	0.00	0 00	0.00	0.00	0.00	0 00	0 00
Employment in public sector (% of urban employment)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private Expenditures										
Consumption (% of GDP)	0.03	0.03	0.03	0.02	0.02	0.02	0 02	0.03	0.04	0.05
Consumption (% of total consumption)	0.01	0.01	0 00	0 00	-0 01	-0.02	-0.02	-0.03	-0 03	-0.03
Investment (% of GDP)	-0.02	-0.03	-0.04	-0.05	-0.06	-0.08	-0.10	-0.11	-0.13	-0.14
Investment (% of total investment)	-0.05	-0.07	-0 10	-0.15	-0.20	-0.26	-0.31	-0 37	-0 43	-0.50
Public Expenditures										
Consumption (% of GDP)	0.00	0.00	0.00	0.01	0.02	0.03	0.03	0.04	0.05	0.05
Investment (% of GDP)	-0.01	0.00	0.00	0.01	0.02	0.03	0.03	0.04	0.05	0.05
Infrastructure (% of public investment)	0.00	0.00	0 00	0.00	0.00	0.00	0.00	0 00	0 00	0.00
Health (% of public investment)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Education (% of public investment)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Public sector wage bill (% of public expenditure)	0.00	-0.01	-0.01	-0.02	-0 02	-0.03	-0.03	-0.03	-0.02	-0.01
External Sector										
Agricultural exports (% of total exports)	-0.03	-0.05	-0.07	-0.10	-0.12	-0.14	-0.14	-0.12	-0.08	-0.03
Imports of non-agricultural goods (% of total imports)	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01	0.00
External debt (% of GDP)	-0 04	-0.02	0.03	0.09	0.17	0.25	0.34	0.42	0.49	0.57
Degree of openness (total trade in % of GDP)	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.02	-0.02	-0.03

[1] Percentage deviations from the base line

Tableau C1

MCS réelle du Maroc compatible avec le modèle IMMPA (version 2)

(Données de 1990 en millions de DH)

Ressources / Dépenses		N°	Facteurs de production				Agents économiques									Secteurs de production					Produits destinés au marché domestique					Exportations			Accumulation	Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
Facteurs de production	Travail rural non qualifié	1														1605.35	10617.40													12222.75
	Travail urbain non qualifié	2																1040.26	1836.56	542.44										3419.26
	Travail qualifié (urbain)	3																	57376.76	24113.77										81490.53
	Capital	4														6166.59	15417.42	12627.39	45839.37	46.82										80097.59
Agents économiques	Ménages ruraux occupés dans des productions N.E.	5	1605.35		32569.17	6166.59	136.74	105.35	13.91	6.96	54.78	242.19		0.00	0.00															40902.63
	Ménages ruraux occupés dans des productions E.	6	10617.40		4071.15	13104.81	17.09	35.45	3.48	3.48	13.69	161.46		0.00	616.75															28644.76
	Ménages urbains non qualifiés employés dans l'informel	7		1040.26		7576.43	68.37	70.90	20.87	13.91	27.39	322.92		0.00	308.38															9449.42
	Ménages urbains non qualifiés employés dans le formel	8		2379.00			119.65	319.04	27.82	41.73	116.40	845.84		0.00	6834.34															10483.82
	Ménages urbains qualifiés	9			24426.67		0.00	35.45	3.48	3.48	13.69	80.73	63.95	538.40	1294.72															26460.77
	Ménages capitalistes	10			20355.74	38327.63	0.00	141.80	0.00	0.00	47.93	161.46	703.49	2153.60	4140.45															66032.12
	Entreprises	11				11058.59								3713.00	914.65															15686.24
	Etat	12				2258.54	0.00	0.50	109.20	536.00	4038.80	2949.50	14562.00	2330.00	6265.00	464.23	1599.11	332.35	29352.59	13.66	56.07	630.03		18905.00							84392.57
	Reste du monde	13			67.60	1605.00	0.00	0.00	0.00	0.00	69.60	116.00	-144.83	7816.00							1780.54	1363.31		58304.07						68977.29
Secteurs	Production rurale N.E.	14																			14548.38					0.85				14549.23
	Production rurale E.	15																				43187.25					5628.17			48815.42
	Production urbaine informelle	16																					20000.00							20000.00
	Production urbaine formelle (privée)	17																						292751.12				35191.75		327942.86
	Production non marchande	18																							34513.80					34513.80
Demande de biens composites	Produits ruraux N.E.	19					4547.05	2864.21	514.23	514.23	1121.79	1904.10				253.43	358.50	0.00	6001.83	13.78									-1708.14	16384.99
	Produits ruraux E.	20					8521.38	5192.72	1844.93	1844.93	4577.68	10075.50				436.57	4130.69	0.00	8911.60	20.45									-375.86	45180.59
	Produits urbains informels	21					2147.33	1473.85	560.48	560.48	1320.21	4078.65				0.00	0.00	6000.00	0.00	0.00									3659.00	20000.00
	Produits urbains formels (privés)	22					19839.11	14516.74	5724.55	5724.55	13900.41	41902.89				5623.05	16692.31	0.00	178624.16	9762.89									55649.51	367960.18
	Services non marchands	23					187.83	154.14	62.25	62.25	248.67	517.87		33280.80		0.00	0.00	0.00	0.00	0.00									0.00	34513.80
Exportations	Produits ruraux N.E.	24													0.85															0.85
	Produits ruraux E.	25													5628.17															5628.17
	Produits urbains formels (privés)	26													35191.75															35191.75
Accumulation		27					5317.49	3733.62	564.22	1171.82	909.74	2873.01	511.63	34560.77	7782.21															57424.51
Total			12222.75	3419.26	81490.53	88097.59	40902.63	28644.76	9449.42	10483.82	25460.77	68032.12	15686.24	84392.57	68977.29	14549.23	48815.42	20000.00	327942.86	34513.80	16384.99	45180.59	20000.00	367960.18	34513.80	0.85	5628.17	35191.75	57424.51		

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