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Center for Economic Policy Analysis

**Zimbabwe: Economic adjustment,  
income distribution and trade liberalization**

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## 1. Introduction – issues and overview

Zimbabwe's economic relations with the rest of the world have changed between extremes. The dramatic shift from import regulation under and after sanctions to full scale trade liberalization offers a unique opportunity for investigating policy-driven globalization.

Usually the economic motivation for such a historic shift is of long run nature. A protectionist regime has costs in terms of limited access to world market innovation and technology and limited competitive pressure in domestic markets. Reform is an attempt to take advantage of global technological progress and competition, although it is not clear that the dreams will come true. In this paper we focus on the short run aspects of liberalization, which are rather seen as obstacles to reform (Rodrik, 1994). Opening up for imports easily may crowd out more output than is gained in export product expansion, and the associated changes in income distribution involve losers who will protest the policy reorientation.

The conventional approach to the consequences of trade reform addresses the microeconomics of labor market adjustments and sectoral competitiveness. Allocation of production factors between sectors clearly is important to understand the experiences made in the recent trade liberalization in Zimbabwe. But the main story definitely looks macro. The key year is 1992, when the trade account was essentially fully liberalized. As confirmed by Table 1, output and investment contracted by about 8-10 %, the inflation rate doubled to above 40%, a consumption boom increased imports, and the trade balance moved into serious deficit. This performance must be understood against the unfortunate background of a coincidental drought, that must take much of the blame for the contraction. The worry is that the GDP never really has recovered. GDP per capita in 1996 is still at the 1992 level, well below the gradually expanding per capita GDP during the period 1985-1991.

[Table 1 about here]

A combination of factors messed up the price system also. While inflation jumped to an annual rate above 40%, nominal interest rates went up to about 30%. The inflation rate was gradually

reduced towards 20% in the mid-90s, but the interest rate showed strong inertia. Consequently, real interest rates turned positive and quite large with depressing effects for investment.

As will become clear, limited data are available to describe the developments in income distribution. The broad agreement among observers, and backed up by numbers below, is that most wage earners took a big real wage loss with the inflation shock and have not recovered. The sources of this distributional shift are hard to sort out, but the new distribution looks like a permanent result of a change in economic policy regime.

We will take the two macro shocks, output contraction and inflation shift, as exogenous events in our analysis. The output contraction is associated with deindustrialization, which is a result of liberalization according to our previous CGE-analyzes (Davies et al., 1998 and Rattsø and Torvik, 1998). The upward shift in inflation is the result of several factors. Econometrics can't help us too much in understanding this episode, but we have had some help from the investigation into the old inflationary mechanisms by Chhibber et al. (1989). The following aspects probably were important. First, the agricultural drought put upward pressure on food prices in particular. Second, trade liberalization contributed to output contraction (in importables) and a consumption boom (drop in savings). This combination of slow (or negative) output response and rapid (positive) demand response of course is a recipe for inflation. Third, the interest rate jump, itself a result of higher required return for financing the still increasing public debt, had a cost push effect on prices. Added to this were the price effects of reluctant, but definite devaluations of the currency. The paper addresses how the output and inflation shocks have worked their way through the economy, in particular concerning distribution and labor markets. The distributional shift is first and foremost the combined result of inflation and employment stagnation.

Broad evaluations of the reform have been written by Davies et al. (1992), Shaw and Davies (1993) and Skålnes (1995), but data have only recently become available for an evaluation of reform results. Gunning and Mumbengegwi (1995) have collected evidence based on firm level data, while Ncube et al. (1996) emphasise the regional context. This article is an expansion of Davies and Rattsø (1996), which supplies more evidence on adjustments and adjustment

mechanisms.

The liberalization process is described in section 2, while section 3 offers a stylized theory of trade liberalization effects in Africa based on the Ricardo-Viner model. An expansion of the theory model is implemented as a CGE model for Zimbabwe, and deindustrialization effects of trade liberalization are calibrated in section 4. We begin the macro analysis by decomposing aggregate demand to identify changes in the short run adjustment mechanisms of the economy. Section 6 provides an econometric analysis of the role of wages in the macroeconomy. The estimation includes the wage formation process described by the wage curve and the consequences of real wage changes for aggregate demand. In section 7, disaggregated labor market data are applied to document changes in distribution and productivity. Concluding remarks are collected in section 8.

## **2. The liberalization process**

Zimbabwe has a particular history of import substitution, against which the recent jump into globalization should be understood. International sanctions during the UDI (Unilateral Declaration of Independence) period represented forced protectionism. The international community did not recognize the settler regime and the United Nations introduced sanctions in 1968. The sanctions induced a period of import-substituting industrialisation and economic diversification. Real GDP grew at an annual rate of above 7 % between 1965 and 1974, but later the escalating war of independence disrupted economic activity.

The sophisticated import control system built up under sanctions was continued by the new government after independence in 1980. The import regulations are described by Davies (1991) and Pakkiri and Moyo (1987). The post-independence boom (1980-82) was unsustainable on foreign exchange grounds, and the government resorted to administered foreign exchange allocation to control the current account deficit. This policy led to macroeconomic stability, but restricted growth. Green and Kadhani (1986) wrote the authoritative account of the early independent period, and Davies and Rattsø (1993) update the evaluation.

Since the mid-1980s, a number of institutional responses to deal with the linkage between import capacity and economic growth were introduced, basically aimed at export promotion. The measures were not without effect, and the relaxation of the foreign exchange constraint can be observed as rising growth rates in the last part of the decade. In view of the relative success of the modified protectionism, this looked like a long run solution of a government with socialist inclinations and rhetoric.

The government had a team of UNDP-funded Australian economists working on possible trade reforms for a couple of years, but still the policy announcement of the Economic Structural Adjustment Programme (ESAP) in the summer of 1990 came as a surprise (Government of Zimbabwe, 1991). It must be understood against the background of increased pressure to join the international trend of liberal economic reform. Outside Zimbabwe, both donors and the Bretton Woods institutions argued for liberalization and could add on funding. Inside the country, the powerful Confederation of Zimbabwe Industries changed its opposition to trade liberalization around 1987-88. Skålnes (1995) reports increasing concerns about the growth effects of regulation inside the ruling party ZANU (PF).

The program contains most elements of the orthodox Washington package, and trade liberalization has been the main area of action. Trade reform was designed to be gradual and implemented over the 1990-95 period, but implementation was accelerated compared to the original plan. The seriousness of the policy intentions was shown in October 1990, when raw materials and inputs to industries were put on a list of Open General Import License (OGIL). Industries in key sectors such as cement, textiles and mining gained free access to imported inputs. As discussed in section 3, we have shown that this first part of the program, emphasizing liberalization of intermediates, had very different consequences compared to the later stages. As early as late 1991, liberalization was extended to include imported final goods. At first the extension was part of the gradualist approach, and new items were put on the OGIL list. The Export Retention Scheme (ERS) introduced earlier in the year was broadened, and all exporters were entitled to retain 15% of export revenues in foreign exchange. Internal trade with ERS imports developed and an unofficial foreign exchange market was started up.

Later trade liberalization took on its own dynamics. In the summer of 1993, the process accelerated, with new extensions of the export retention and free trading of ERS entitlements. Individuals were allowed to open foreign exchange accounts, and a dual foreign exchange market developed with an official and an ERS exchange rate. Foreign exchange accounts were later extended to the corporate sector. External borrowing was allowed and exchange controls were relaxed (e.g. travel). The opening up for foreign capital flows was partly motivated by the high cost of domestic private credit. During 1994, the dual exchange rates were unified. All of these reforms have made Zimbabwe an extremely open economy, although some of the reforms have been reversed following currency crises in 1998—for example, the removal of foreign currency accounts for corporations. The only restrictions left on the capital account concern returns to investments made before independence and holding foreign assets abroad.

### **3. Trade liberalization and adjustment of income distribution: Theory**

Trade liberalization changes the conditions of industry, and the consequent economic adjustment influences wages and profits, altering income distribution. The main structural change promoted is the shift from importables production to exportables. In large parts of Africa, the distinction between importables and exportables is closely linked to the separation between industry and agriculture/raw material production, which broadly mirrors the urban/rural divide.

Below, a simple model is outlined to discuss the implications of breaking down the protection of domestic industries. The framework is a compressed Ricardo-Viner model, concentrating on the interplay between importables and exportables. It is a simplification of the three-way disaggregation including nontradables, which has been used in many applied analyses since it allows simultaneous discussion of the foreign terms of trade and the real exchange rate. Rodrik (1994) and Rattsø and Taylor (1998) utilize the three sector framework to understand trade liberalization effects in more general terms. Rodrik (1998) has produced numerical simulations to quantify distributional implications of trade reform in a similar setup.

The labor force is distributed between the importables/industry sector and the exportables/agriculture sector. Exportables/agriculture is assumed to absorb the labor force not employed in

importables/industry. From this dual economy perspective, the wage level is consequently determined by the marginal productivity of labor in exportables/ agriculture. In the simplest form, the product real wage is constant and determined by subsistence. It seems more realistic to allow the real wage to fall when more labor is channelled into exportables/ agriculture.

Protectionism is best represented as a tariff equivalent of a quota raising the price of importables above the world market level. This represents a rent that is determined by the size of the quota and domestic market conditions in importables. Given ordinary supply and demand functions for importables, a small import quota drives up the rent and the employment in importables/ industry.

Figure 1 describes the structural adjustment in the importables product market and the exportables labor market. Two motivations for having an import quota are easily derived from the diagram. With world market price  $P^*$ , the excess demand for importables contributes to a trade deficit that is undesired or cannot be financed. The import compression implemented in 1983 after the post-independent boom, was introduced to control the trade deficit, and then acted as a macroeconomic policy instrument. An import quota also allows the country to move up along the importables supply curve as a way of industrializing. In the diagram, the import quota induces a higher domestic price of importables (tariff equivalent  $t$ ) and generates higher profits, outlays and quota rents. In this setup, African protectionism has first foremost benefited capitalists in domestically oriented industries. Agriculture has been discriminated against by high prices of domestic inputs and overvaluation of the currency. When this holds true, trade liberalization should work progressively in terms of income distribution.

[Figure 1 about here]

Elimination of the quota drives down the domestic price of importables to its world market level, reducing importables profits and eliminating quota rents. Reduced importables production, that is deindustrialization in the African context, and a widening trade deficit, are to be expected. The drop in importables/ urban employment increases labor supply in agriculture/ rural areas and leads to a downward pressure on the wage level (if marginal productivity of labor is falling in

employment). The distributional consequences of trade liberalization are a reversal of the redistribution obtained by protectionism. The hardest part to predict is the losers of the rents. In a centralized and strictly controlled import licensing system, there is no second-hand market for imports and the government absorbs the rent. In a less controlled system, rents may be taken by the owners in the importables sector, who consequently lose from liberalization. If importables/industrial wage earners are able to take a share of the rents (Rodrik, 1998), their loss will be bigger too. Trade liberalization in this African structure looks like a clear shift of income from industry to agriculture and from urban to rural areas.

The political economy of trade liberalization in Africa then should involve a strong rural/agricultural constituency as the driving force of the process. Domestically oriented industries and groups capturing quota rents are expected to oppose trade liberalization. This emphasis on functional income distribution may exaggerate the role of sectoral balances. As consumers, all gain from the improved availability of foreign goods, and this desire for world market access may dominate the political battle. In addition, even if the industrial sector is oriented towards the domestic market, firms would like access to foreign intermediates and technology.

Outside the model, if importables contraction is fast and exportables expansion is slow, nontradables and informal production activities may take a loss from the demand side. On the other hand, exportables expansion may be helped by additional mechanisms. Access to importables at lower prices may improve incentives to engage in exportables production—a classic argument about the export stagnation under protectionism. Deregulation of capital flows has a similar effect of raising the attractiveness of foreign exchange earnings. And firms in the importables sector that are made unprofitable, may shift to industrial exportables. These factors tend to shift the exportables labor demand curve outward, thereby contributing to higher wages. Rattsø (1999) has written an elaboration of this approach including a separation between upstream and downstream industries.

As mentioned in the introduction, the microeconomic framework has shortcomings. Macroeconomic balances also seem to respond to liberalization. The new availability of foreign goods tends to lead to a drop in private savings. High savings under protectionism have been

forced postponement of consumption. On the real side, the drop in savings implies a consumption boom and an increased trade deficit, thereby threatening the credibility of the program. Monetary transmission mechanisms may include higher interest rates and possibly foreign exchange appreciation. The distributional implications of these macroadjustments are more complex and less distinct than those of the sectoral imbalances.

#### **4. Liberalization and deindustrialization: CGE model analysis**

As outlined above, the Zimbabwe reform from quantitative import regulation to trade liberalization has changed significantly the conditions for production and distribution. The first liberalization measures during 1990-91 gave easier access to imported intermediates and raw materials, and an overall expansion of import dependent activities was expected. The delayed devaluation kept imported inputs cheap although some tariffs and charges were imposed. Opening up for free imports of inputs basically allowed the protected domestically oriented industries to expand and involved no structural change. Firms with the most restricted access to imports before the liberalization of course benefited most. No shift from domestically oriented to export activities was observed and the exports stayed on trend during 1991.

The extension of liberalization to final goods during 1991-92 changed the conditions for import-competing industries dramatically. They had been protected from competition for decades. The inflow of imported final goods made many domestically oriented manufacturing firms unprofitable. Imports have crowded out domestic production. The negative effect on industrial production was influenced by the 1992 drought with reduced agricultural income and demand and reduced access of inputs from agriculture to industrial processing. Other aspects of the adjustment process were important too. The interest rate shock associated with financial liberalization raised the costs of working capital, and the real wage reduction analyzed below reduced labor costs.

The coincidence of liberalization and drought motivates a counterfactual analysis of the liberalization process to separate out the effects of liberalization. A CGE model extending the theoretical framework above to include food agriculture, infrastructure and nontradables as

separate production sectors have been used to quantify distributional shifts with liberalization. The starting point is a model representing the import compression regime at work through the 1980s, as analyzed by Davies, Rattsø and Torvik (1994). Import rationing allocates intermediates and investment goods, and also includes importables and food, and the domestic markets for importables and food are protected from international competition. Trade liberalization is analyzed as a regime shift imposed on the benchmark import rationing model eliminating controls. Full documentation is given by Davies et al. (1998) and more recently by Rattsø and Torvik (1998).

In this economy-wide setup, we can identify several expansionary and contractionary elements involved in a trade liberalization process. Expansionary effects include lower costs of intermediate goods and higher domestic content of investment goods. In addition, reduced savings rates mean more consumer demand out of a given income. The savings rates are calibrated to reproduce the GDP fall with drought, which implies a fall by about 15% points on average. The changing domestic markets imply that countervailing contractionary effects also are in action. The opening up of the market for importables crowds domestic producers out of the market. The old protection was efficient. The access to non-competitive consumer imports switches demand from domestically produced goods.

The model predicts that the combined final goods liberalization and drought contracted output, but expanded consumption. The trade liberalization implies expenditure switching from domestic to foreign goods that adds contraction to the drought. The expenditure switching from the future to the present when final goods imports are available explains the consumption boom. The model expects the main contraction to affect importables. A private consumption boom is expected even with the serious drought. The decrease in domestic demand produces a real exchange rate depreciation and exportables expansion, but this is dominated by the drop in exports related to agricultural markets and drought. Not surprisingly, the combination of drought, domestic contraction, import liberalization, and increased consumption has a major impact on the trade balance. So far the story is fairly consistent with the actual development described in Table 1.

To isolate the effects of the 1992 drought, we have constructed a counterfactual where agricultural output is 'normal'. Other assumptions are held constant; in particular we assume that the drop in savings rates calibrated fully represent a trade liberalization effect. Even with this drop in savings rate, the final goods liberalization without drought is contractionary. The combined intermediate and final goods liberalization is slightly expansionary. The previously protected importables sector is a key player in the adjustment process. In the old regime, both intermediate inputs and finished importable goods were rationed. When the sector got free access to intermediates, output expanded. When the final goods protection was removed, the loss of market share dominated increased consumer demand.

The CGE model tells a story of trade reform that generates structural adjustment away from non-tradable and importable goods towards exportables. The distributional consequences are moderate as long as the labor force follows this relocation. It is puzzling to us that intermediate goods liberalization is not more expansionary for manufacturing industries. After all, the intermediate rationing has been seen as the major factor explaining output stagnation after independence. It seems to us that domestic industries had adjusted to the rationing regime and were not ready for new expansion after the freeing of intermediate imports. This factor has consequently not been strong enough to avoid deindustrialization. The moderate income distribution effects predicted by the CGE model have been overtaken by reality. As shown above, inflation jumped and real wages fell quite dramatically. The inflation effect, which must be understood outside the real CGE model, also threatens the reallocation to exports. However, the lack of a nominal wage response to inflation obviously has helped exportables avoid the contractionary effect of real appreciation.

The CGE model analysis helps us understand the contractionary output and deindustrialization effects observed. But the distributional shifts have been much more dramatic than predicted by the CGE model. This motivates our emphasis on macro shocks in the rest of the paper, where we take the deindustrialization and the shift in inflation as given.

## **5. Changing sources of aggregate demand**

As a complement to the CGE model understanding of adjustment mechanisms, we turn to the

short run determinants of economic activity linked to aggregate demand components and parameters. Liberalization is expected to change the working of the macro economy. In particular, as the economy opens up, the foreign sector should begin to play more of a role in aggregate demand. Also the lifting of constraints may disturb the established savings-investment process as new economic conditions face savers and investors. Applying the framework of Taylor (1998), we can identify different elements of a possible shift in the structure of aggregate demand. The methodology is presented in appendix 1.

The implementation of this decomposition using national account's data, presented in Table 2, shows that the aggregate demand process certainly has shifted with liberalization. The before-liberalization period 1986-90 is compared to the post-liberalization period 1993-97. The years 1991 and 1992 are omitted, partly to avoid the 91-92 drought and partly to concentrate on the post-reform rather than the transition period. The relative change in output was similar in the two periods. The relative ranking of the contributions of the three sectors to the overall change is about the same in both periods. However, there has been a shift in the demand injection from the public sector to the foreign sector. After reform, the public sector has had a negative effect, while the foreign sector has contributed to about 3.2 % points of the growth.

[Table 2 about here]

The second part of Table 2 breaks these contributions into their 'stance' and 'multiplier' or 'injection' and 'leakage' components. Before the reforms, the bulk of the action came from the change in the savings parameter. If the only change that had occurred had been the drop in the savings parameter, total output would have risen by 2.1 % point because of the greater multiplier. Although the overall impact of the private sector in the two periods is not very different, the parameters imply that savings are more important and investment less important after reform. In the foreign sector the opposite is true. The injection effect of export growth is much larger after reform (4.6 vs. 1.9 % point), while the rising import propensity has a much greater negative impact (-0.2 vs. -1.4 % point).

While the relative importance of the overall injection and leakage effects were roughly similar before and after the reform, within each sector they are very different. In the private sector the savings parameter effect rises. This is consistent with the view that a regulated economy induces

forced savings, possibly by constraining consumption opportunities. Liberalization removes these constraints, causing the propensity to save to fall and the multiplier to rise. The reduced injection effect of investment after reform confirms the broad evidence that investment declines with reform. Although the government sector effects are small, they also are in accordance with observations elsewhere. As part of the reforms, government has attempted to reduce spending and taxation. The injection effect is consequently turned around after reform, while the reduction in taxation raises the multiplier. The foreign sector effects reflect the elimination of import rationing. Imports were previously kept low by import rationing, and liberalization has raised import propensities and reduced the multiplier. The injection effect is increased by exchange rate depreciation and other export stimuli.

## **6. Wages in the macroeconomy: Wage curve and wage-demand-linkage**

In the introduction we have argued that macroeconomic factors are the main determinants of distributional shifts in Zimbabwe. In this section we use macroeconomic data to evaluate the wage formation process and the linkage between distribution and aggregate demand.

The first issue to be analyzed is the real wage consequences of inflation. The approach chosen is the estimation of wage curves following the tradition of Oswald (1996). The nominal wage level ( $W$ ) is assumed to respond to the price level ( $P$ ), productivity ( $Y/L$ ) and macroeconomic fluctuation (capacity utilization  $CU$ ). The econometric results are reported in Table 3. Most interestingly, the estimates show no wage response to inflation. This extreme nominal wage rigidity implies a sharp reduction of the real wage level with the rise in inflation. The results conform with the observation that wage earners in Zimbabwe have suffered a big loss in real wages. We are only able to detect stable short run effects on the nominal wage performance, since all long run variables are insignificant. No inertia are identified in the time adjustment of wages, but there is a trace of stability feedback to the evolution of the real wage.

[Table 3 about here]

The short run determinant of nominal wages is the capacity utilization. The wage level has an elasticity of about 0.6-0.8 with respect to capacity utilization. The drop in capacity utilization rate of about 12 % from 1991 to 1992 has contributed to a reduction of the wage level of about 8-9 %. The capacity utilization rate in 1997 is still below the 1990-91 peak. It follows that real wages have gone down because of both inelasticity to inflation and elasticity to capacity utilization. There is no additional shift in the wage path associated with liberalization (as tested with a liberalization dummy post 1992). Although few econometric analyses of the wage process are available for comparison, the weak price indexation of wages is consistent with Chhibber et al. (1989).

The second aspect analyzed is the possible consequences of the changing real wage for aggregate demand. We have already documented in section 4 that the linkage between demand components and economic activity has changed. Here we address the question whether the new distribution of income influences aggregate demand. The analysis concentrates on private investment (I), private and public consumption (CG), and the total.

The results in Table 4 show that the real wage has no effect on aggregate demand. There is no link between this measure of income distribution and the components of aggregate demand investigated. This may be explained by the procyclical real wage documented. The strong short-run responses to GDP variation may include the associated shift in the income distribution. The short run elasticity of both investment and consumption (and the total) with respect to GDP is well above 1. The estimated coefficients imply an unstable demand-determined macroeconomy. As will come clear below, we think that supply constraints contribute to stability.

[Table 4 about here]

To check the robustness of the result, the impact of the wage share has been estimated as an alternative to the real wage. The wage share comes out with a positive impact on investment demand. The result is hard to explain.

The dynamics of the consumption and investment functions represent adjustment inertia and a

long run elasticity with respect to GDP of about 1. The time path of consumption has stronger inertia than investment, which is in accordance with conventional wisdom. Neither adjustment inertia nor long run relationships are detected for the total of investment and consumption. There has been no shift in the demand functions related to liberalization (as investigated by a liberalization dummy from 1992 on). Mehlum and Rattsø (1994) and Jenkins (1996) find significant effects of various measures of the import regulations, and confirm the present result that real wages are not important.

## **7. Labor market adjustments: wage structure**

Most observers would agree that income distribution in Zimbabwe has widened since the reform program was introduced. Unfortunately, the data required to substantiate this observation do not exist. We have two sets of data to use. The first is an annual salaries and wages review of firms, undertaken by Price Waterhouse Coopers. This is intended to provide users with data on the trends in pay structures. It offers information on the pay for various grades of work but does not give any indication about the numbers of people in those grades. We can thus use it only to illustrate the evolution of pay structures, not income distribution.

We selected several grades by examining the data for highest and lowest paid jobs in different general categories. Our choice was partly influenced by continuity of data for the grades. In Table 5 we show the basic pay for median workers in 9 representative categories, expressed as a ratio of the pay of a security guard, one of the lowest paid categories. The most noticeable feature of the table is the escalation of executive pay relative to general salaries.

[Table 5 about here]

While all executive grades have experienced relative improvement over the full period 1989-97, general grades above security guards have had declining relative wages. Within the two levels there is no striking change to the structure. We could not find a significant trend towards a particular type of skill.

The rise in executive salaries is consistent with a number of explanations. Greater international mobility of these categories makes them a 'tradable' factor, so that liberalization raises their

relative price as it does any tradable good. Greater reliance on collective bargaining in the context of the distorted structure of the Zimbabwean economy allows executives to protect themselves vis-à-vis workers. The creation of a more competitive, less regulated economy places a greater premium on managerial capabilities. We have not tested these alternatives, but they all suggest that we should not be surprised at the evidence.

The second source of labor market information is the sectoral employment and earnings data published by the Central Statistical Office. The reliability of these data has been increasingly questioned in recent years and it is recognized that the labor market surveys on which they are based fail to capture data from new firms. The following discussion should be read with this caveat in mind.

As with the decomposition of aggregate demand, we compare the pre-reform period (1986-90) with the post (1993-97), omitting the two transitional years. The data suggest a strong redistribution towards profits in the post-reform period. On average across all sectors, wages fell from 46% to 34% of value added. The real product wage fell by some 21% while output per worker rose by 6%. Such changes are consistent with the inflation driven redistribution we have identified earlier. Decomposing the 11 percentage point change in the wage share shows that 9 percentage points can be accounted for by changes in wage shares within sectors; the remaining two percentage points arise because of the changing composition of GDP. This is consistent with our earlier analysis that the redistribution mechanism is a macroeconomic one, impacting across all sectors, rather than a microeconomic one arising from a reallocation of resources.

## **8. Social Policy**

To understand the post-reform approach to social policy, it is necessary to examine the approach taken in the 1980s. At independence in 1980 the new government made an attempt to narrow the inherited racial gap in living standards. Budgetary transfers were the main instrument used. On the expenditure side, education and health were the key elements of the social wage. The education system expanded rapidly, with non-fee paying primary education and heavily subsidized secondary education. Access to health care services was also improved. Free health care service was offered large parts of the population, including most industrial and all

agricultural and domestic workers plus all communal farmers and unemployed. In this early period the application of the rules for determining free access was lax, so a large number of people benefited. Free immunization and other aspects of the improved preventive health care program also added to the social wage (Davies and Sanders, 1988). On the tax side, the post-independence tax structure was relatively progressive. Thus on both the expenditure and the tax side, the post-independence budgets improved income distribution and probably strengthened the improvements that were taking place in the primary distribution with the post-independence boom. Outside the budget, a legislated national minimum wage was the primary instrument used to address inequality. This, which was coupled with legislation preventing firing of workers, significantly increased in real earnings among the low paid. In rural areas agricultural support schemes were extended to previously excluded small-scale farmers.

It is significant that most of these efforts to redress social inequalities were directed at transferring income rather than restructuring wealth ownership. Although there was some effort made to resettle peasants on former white farms, these were minimal and largely irrelevant. Despite the government's socialist rhetoric, it acted as though the problem was a surface phenomenon rather than something which required structural re-organization of the economy to eradicate. Its approach was therefore more welfarist than socialist. At the time, government argued that it was constrained from taking more radical solutions both by the independence constitution and by the threat from South Africa, although this argument has been disputed (see Davies, 1988). Rather the approach adopted revealed the essentially populist nature of the government. Visible contributions to welfare which can be attributed to government (such as provision of free education) are more politically desirable than less visible and indirect ones (such as real wage growth), even though the latter may make a more significant impact. Furthermore, the willingness to tackle wealth distribution declined over time as the governing and bureaucratic hierarchy began to emerge as an economic elite.

This preference of government was revealed further after 1983, when government policies became more concerned with stabilization, and the distributional gains achieved started to be eroded. Although it was concerned with reducing the budget deficit, government defended the social wage through its budgetary allocations, so that real expenditure per head in education and

health did not decline significantly (see Davies, Sanders and Shaw, 1992). Rather the cuts fell on capital expenditure. The minimal allocation for land redistribution and resettlement was the first budget vote to be cut. Outside the budget, government not only permitted the erosion of real wages, but used the minimum wage legislation to restrict rather than promote wage increases for the low paid. The consequent decline in the real wage not only offset some of the gains from the social wage but also undermined the ability of the poor to make use of these public provisions. For example, drop out rates at school started to rise, apparently as families were unable to carry the indirect costs of school children.

The initial announcement of the new policy stance in 1990 made mention of the possible consequences for disadvantaged groups. However, it was apparent that government was concerned with these mainly because of the potential for social unrest that they created, rather than because of the intrinsic negative welfare consequences. The first draft of the document spelling out the reform program concerned itself only with the macroeconomic design of the program. Specific discussion of the social dimensions was included at the insistence of the World Bank and the section dealing with this in the published document was written by the Bank. (Recall that this was the time when the Bank itself had begun to take social dimensions of adjustment more seriously.)

After 1990 attempts were made to control the fiscal deficit, for good macroeconomic reasons. But given the limited capacity to tax, spending has been held down and social services for a growing population have not been improved. User fees were introduced for the previously free education and health services. To cushion the poor from the some of these effects, the Social Dimensions of Adjustment (SDA) program was introduced in 1991. It established a Social Development Fund which provided financial assistance to households earning less than \$400 per month to help them meet the increased user costs for education and health associated with ESAP. It also provided a small income supplement to offset the effects of deregulation of basic food prices. The SDF also provided introductory training courses and soft loans for retrenched who had started new businesses.

The impact of the SDA was marginal, in part because of inadequate funding. The donor funding

which had been anticipated in support of this program also fell short of expectations. However, although this funding was clearly insufficient, the SDA was also poorly designed and implemented. Administrative processes were slow and cumbersome. Allocations had a strong bias in favour of retrenched civil servants and against women. The SDA was also hampered by the effects of the drought, which both increased the number of people requiring assistance and also channelled resources away from the SDF into specific drought-related programs.

The Poverty Alleviation Action Plan (PAAP), drawn up in 1994 with the assistance of UNDP and other donors, was an attempt to address these problems. It was intended to tackle issues of structural poverty rather than simply to mitigate the effects of adjustment, as had been the case with the SDA. Its main component, which has drawn donor support, is the Community Action Project, which is intended to finance small grants and technical assistance for local communities through decentralized local government and community structures.

There has thus been some evolution in the approach to poverty alleviation since ESAP was introduced. The initial view—which was in keeping with government's revealed preferences in the 1980s—seemed to be that the negative effects would be transitory and therefore required only short term mitigation. It is now realized that the problems are more deep-seated—and not solely related to adjustment—and therefore require a longer term approach. However, while this change in focus improves upon the SDA, the PAAP suffers from a similar inadequacy of resources (UNDP, 1999).

The focus of social policy in the 1980s meant that the gains made were especially vulnerable to reversal through the macroeconomic processes outlined in this paper. Even welfarist transfers can have important structural impacts on an economy if they are sustained for a long time. As the endogenous growth literature has shown, a better educated and healthier population has significantly better growth prospects than a poorly educated and less healthy one. However, such improvements take time to bear fruit. Their erosion in the 1990s significantly undermine long term growth prospects for the economy.

## 9. Concluding remarks

Globalization in the case of Zimbabwe is primarily policy induced, stemming as it does from liberalization of the trade and capital accounts of the 1990s. While the ambition of the liberalization was to stimulate competition and world market orientation, the experiences so far have not been very encouraging. GDP per capita in 1997 is still well below pre-liberalization levels. Income distribution has worsened, first foremost because of a shift in inflation with rigid nominal wages, but also because of stagnating output and employment.

The loss of real wages is not necessarily the result of liberalization. Other factors certainly have contributed to the shift in inflation. But we argue that liberalization changed the conditions for macroeconomic balance, and the underlying fiscal problem came into the open as inflation. Old regulations had kept private savings high; the new availability of foreign goods created by liberalization led to drop of savings and consumption boom. If this story is true, Zimbabwe is another example of the disadvantage of liberalizing when macroeconomic, in particular fiscal, balances are not under control.

Our contemplation of recent liberalization experiences in Zimbabwe has led us back to our previous evaluation of the first independence period (Davies and Rattsø, 1993). There are some striking similarities. When the first independent government took office in 1980, it attempted a redistribution with growth reform. Wage and fiscal policy was meant to stimulate demand, productivity and equal distribution. The reform ran into macroeconomic difficulties. The combined private savings deficit and government deficit were accommodated by foreign savings. Concern about accumulating foreign debt led to abortion of the distribution initiative and tightening of controls. The liberalization program of the 1990s led to similar adjustments of the savings-investment balance. The drop in private savings coupled with a continued government deficit once more necessitated inflow of foreign savings. There now are some signs of this causing reversal of the liberalization process, with the removal of corporate foreign currency accounts, increasing attempts by government to control basic prices and a gentlemen's agreement between the Reserve Bank of Zimbabwe and commercial banks to run a fixed exchange rate.

Although there are these striking similarities, our analysis also suggests that the adjustment mechanisms have been different. In the early 1980s, the inflation was kept low, real wages grew slowly, there was no obvious widening of the income gap and no deindustrialization. In the 1990s, the macroeconomic imbalance led to high inflation, real wage decline, sharp worsening of the income distribution, and deindustrialization. It is hard to avoid thinking that these new mechanisms of distribution are to the disadvantage of those at the lower end of the income scale.

Zimbabwe's experience highlights the dilemma faced by governments wishing to undertake rapid poverty reducing programs through budgetary processes (what we may call fiscal populism). Not only are such approaches vulnerable to reversal because of macroeconomic imbalance, but, to the extent that the imbalances arise because of the programs, they may be inherently self defeating.

Policy recommendations are not easy to make in this situation. Since our analysis suggests that the different adjustment mechanisms under the regulated economy shielded the poor more than those under the liberalized one, a reversion to the pre-1990 regulations may seem appealing. However, this conclusion is not warranted from our analysis in this paper, since we have not addressed the underlying sustainability of such a regime. Evidence from the 1980s suggests that it was not sustainable. Nonetheless, although a complete reversion is hardly a good idea, industrialization and equity do need a helping hand from the government. Tariff policy and other instruments should be used to promote industrialization.

Although there appears to be a trade off between macroeconomic imbalance and fiscal populism, there is clearly scope for government to improve this trade off by better prioritization of expenditures since not all of the macroeconomic imbalance can be attributed to the social expenditures. At the same time more attention needs to be paid to redistribution processes outside the budget.

## References

- Chhibber, A., Cottani, J., Firuzabadi, R. and Walton, M., 1989. Inflation, price controls, and fiscal adjustment in Zimbabwe, Working Paper 192, Country Economics Department, The World Bank
- Davies, Rob (1988) "The Transition to Socialism in Zimbabwe: some areas for debate", in C Stoneman (ed.) *Zimbabwe's Prospects: issues of race, class, state and capital in Southern Africa*, (Heinemann, London and Basingstoke), 18-31
- Davies, R., 1991, Trade, trade management and development in Zimbabwe, in Frimpong-Ansah, J., Kanbur, S.M.R. and Svedberg, P. (eds), *Trade and Development in Sub-Saharan Africa* (Manchester, Manchester University Press)
- Davies, R and Rattsø, J., 1993, Zimbabwe, in L. Taylor (ed.), *The Rocky Road to Reform: Adjustment, Income Distribution and Growth in the Developing World* (Cambridge, MIT Press)
- Davies, R. and Rattsø, J., 1996, Growth, distribution and environment: Macroeconomic issues in Zimbabwe, *World Development*, vol. 24, no. 2, 395-405
- Davies, R., Rattsø, J. and Torvik, R., 1994, The macroeconomics of Zimbabwe in the 1980s: A CGE-model analysis, *Journal of African Economies*, vol. 3, no. 2, 1-46
- Davies, R., Rattsø, J. and Torvik, R., 1998, Short run consequences of trade liberalization: A CGE model of Zimbabwe, *Journal of Policy Modeling*, 20, 3, 305-333
- Davies, R. and Sanders, D., 1988, Adjustment policies and the welfare of children in Zimbabwe, 1980-85, in A. Cornia, R. Jolly and F. Stewart (eds.), *Adjustment with a Human Face*, Vol. 2 (Oxford, Oxford University Press)
- Davies, R., Sanders, D. and Shaw, T., 1992, Liberalization for development: Zimbabwe's adjustment without the fund, in G. A. Cornia, R. van der Hoeven and T. Mkandawire (eds.), *Africa's Recovery in the 1990s: From Stagnation and Adjustment to Human Development* (Houndsmill, Macmillan, 135-155)
- Government of Zimbabwe, 1991, *Zimbabwe : A Framework for Economic Reform 1991-95* (Harare, Government publication)
- Green, R. and Kadhani, X. 1986, Zimbabwe: Transition to economic crises 1981-1983: Retrospect and prospect, *World Development*, vol. 14, no. 8, 1059-1083
- Gunning, J. and Mumbengegwi, C. (eds), 1995, The manufacturing sector in Zimbabwe: Industrial change under structural adjustment, final report on the round II RPED survey data, mimeo, Free University of Amsterdam and University of Zimbabwe

- Jenkins, C., 1996, Post-independence economic policy and investment in Zimbabwe, mimeo, Centre for the Study of African Economies, University of Oxford
- Mehlum, H. and Rattsø, J., 1994, Import compression and growth constraints in Zimbabwe, mimeo, University of Oslo and Norwegian University of Science and Technology
- Ncube, M., Collier, P., Gunning, J. and Mlambo, K., 1996, Trade liberalization and regional integration in Zimbabwe, mimeo, AERC and Centre for the Study of African Economies, University of Oxford
- Oswald, A., 1996, Wage curves (Cambridge, MIT Press)
- Pakkiri, L. and Moyo, N.P., 1987, Foreign exchange policies : The case of Zimbabwe, paper presented at IDRC Workshop on Economic Structure and Macroeconomic Management, Harare
- Rattsø, J., 1999, Income distribution, growth and protectionism in Sub-Saharan Africa and the case of Zimbabwe, forthcoming in Festschrift to George Waadenburg, Erasmus University Rotterdam.
- Rattsø, J. and Taylor, L., 1998, CGE-modelling of trade liberalization in sub-Saharan Africa: An evaluation, mimeo, Department of Economics, Norwegian University of Science and Technology and Department of Economics, New School of Social Research.
- Rattsø, J. and Torvik, R., 1998, Zimbabwean trade liberalization: ex post evaluation, *Cambridge Journal of Economics*, 22, 3, 325-346
- Rodrik, D., 1994, Trade and industrial policy reform in developing countries: A review of recent theory and evidence, in Behrman, J. and Srinivasan, T.N. (eds), *Handbook of Development Economics Volume III* (Amsterdam, North-Holland)
- Rodrik, D., 1998, Why is trade reform so difficult in Africa?, *Journal of African Economies*, 7, 43-69 (Supplement 1: June)
- Shaw, T. and Davies, R., 1993, *The Political Economy of Adjustment in Zimbabwe: Convergence and Reform* (Ottawa, North South Institute)
- Skålnes, T., 1995, *The Politics of Economic Reform in Zimbabwe* (London, Macmillan)
- Taylor, L., 1998, Project on globalization and social policy: Revised methodology for country studies, mimeo, CEPA, New School of Social Research
- UNDP (1999) *Zimbabwe Human Development Report 1998* (Harare, UNDP/Poverty Reduction Forum/Institute of Development Studies)

## Appendix 1: Decomposition of aggregate demand: Methodology

The basic structure of the aggregate demand model is:

$$(1) \quad X = Y + T + M$$

$$(2) \quad X = C + I + G + E$$

$$(3) \quad sX = Y - C$$

$$(4) \quad tX = T$$

$$(5) \quad mX = M$$

where

$X$  – ‘output’, GDP + imports

$Y$  – private sector income

$T$  – taxes net of transfers

$C$  – private consumption

$I$  – private investment

$G$  – government purchase of goods and services

$E$  – exports

and  $s$ ,  $t$  and  $m$  are defined by equations (3)-(5).

When we solve out for  $X$ , the usual multiplier comes out:

$$(6) \quad X = \frac{1}{s + t + m} (I + G + E)$$

The model separates between shifts in the injections ( $I$ ,  $G$  and  $E$ ) and in the leakage parameters ( $s$ ,  $t$ , and  $m$ ). In order to see whether there have been such shifts, we need to decompose the sources of aggregate demand. To simplify the notation, we rewrite (6):

$$(7) \quad X = k Z, \text{ where } k \text{ is the multiplier in (6) and } Z = I + G + E$$

Decomposition of (7) can be written as (8), where  $k_0$  and  $Z_0$  are initial or base year values:

$$(8) \quad \Delta X = k_0 \Delta Z + Z_0 \Delta k + \Delta Z \Delta k$$

To facilitate an easy interpretation of changes in leakage parameters, we define

$$k_1^s = \frac{1}{s_1 + t_0 + m_0}$$

$$k_1^t = \frac{1}{s_0 + t_1 + m_0}$$

$$k_1^m = \frac{1}{s_0 + t_0 + m_1}$$

to get

$$(9) \quad \Delta k = (k_1^s - k_0) + (k_1^t - k_0) + (k_1^m - k_0) + \xi$$

where  $\xi$  is an error term arising because the decomposition is not exact.

The terms on the RHS of (9) show how the multiplier would have changed if only one of the leakage parameters had changed—the other two remaining at their previous period level. When we substitute (9) into (8), we can identify separately the contribution of each of the individual parameters to the changes in X. To make the results comparable with the Taylor (1998) decomposition, we distinguish between injection and leakage for each of the components of aggregate demand:

$$\Delta X = \underbrace{k_0 \Delta I}_{\text{Injection}} + \underbrace{Z_0 (k_1^s - k_0)}_{\text{Leakage Parameter}} + \underbrace{k_0 \Delta G}_{\text{Injection}} + \underbrace{Z_0 (k_1^t - k_0)}_{\text{Leakage Parameter}} + \underbrace{k_0 \Delta E}_{\text{Injection}} + \underbrace{Z_0 (k_1^m - k_0)}_{\text{Leakage Parameter}} + \underbrace{Z_0 \Delta Z \xi}_{\text{Interaction term}}$$

## Appendix 2: Econometric analysis of the role of wages in the macroeconomy

The wage curve is hypothesized to have this general form:

$$(10) \quad W/W_{-1} = F(P, CU, YL)$$

where

W – nominal wage rate (wage per manyear)

YL – GDP per worker

CU – capacity utilization rate

P – consumer price index

The econometric formulation of the equation for the period 1975-1996 applies an error-correction model specification:

$$D\log W = a \log W_{-1} + b D\log CU + c \log CU_{-1} + d D\log P + e \log P_{-1} + f D\log YL + g \log YL_{-1}$$

The second relationship is a 'distribution schedule' is (where AD is aggregate demand):

$$(11) AD = G(GDP, W/P)$$

and new variables are:

WS – wage share

GDP – real gross domestic product

CG – general consumption, both private and public

The following error-correction models are estimated:

$$D\log I = a \log I_{-1} + b D\log GDP + c \log GDP_{-1} + d D\log W/P + e \log W/P_{-1}$$

$$D\log CG = a \log CG_{-1} + b D\log GDP + c \log GDP_{-1} + d D\log W/P + e \log W/P_{-1}$$

$$D\log(CG+I) = a \log(CG+I)_{-1} + b D\log GDP + c \log GDP_{-1} + d D\log W/P + e \log W/P_{-1}$$

**Table 1 – Macroeconomic performance**

	1990	1991	1992	1993	1994	1995	1996
GDP growth <sup>1</sup>	7.0	5.5	-9.0	1.3	6.8	-0.8	7.6
GDP per capita <sup>1</sup>	2196	2247	1982	1940	2003	1921	2002
GFCF Growth <sup>1</sup>	34.7	23.1	-8.5	7.9	5.3	-10.9	-1.3
Inflation <sup>2</sup>	12	23	42	28	27	23	21
Exports <sup>3</sup>	1750	1785	1530	1610	1947	2216	-
Imports <sup>3</sup>	1510	1700	1781	1512	1778	2128	-
Trad bal <sup>3</sup>	0	-245	-602	-89	-108	-164	-
Manufact <sup>4</sup>	139	143	130	119	131	113	117

1) National Accounts 1985-1997, CSO May 1998, Zim\$, 1990-prices

2) Same, consumer price index

3) Merchandise exports and imports, trade balance including services, mill USD, ZIMPREST (Zimbabwe Program for Economic and Social Transformation) 1996-2000

4) Index of volume of production of the manufacturing industries, 1980=100, Quarterly Digest of Statistics, CSO March 1998, Table 17.0.

**Table 2 - Decomposition of Sources of Change in Total Output**

Percent of period average output

	Private	Government	Foreign	Interaction	Total
1986-90	3.4	0.9	1.7	-1.4	4.6
1993-97	4.0	-1.0	3.2	-1.4	4.8

  

	Private Sector		Government		Foreign Sector		Total	
	Invest	Sav	Exp	Tax	Exports	Imports	Inject	Leakage
1986-90	1.3	2.1	1.5	-0.6	1.9	-0.2	4.7	1.3
1993-97	0.9	3.1	-1.0	0.0	4.6	-1.4	4.5	1.7

**Table 3 – Wage curve for Zimbabwe**

	DlogW	DlogW	DlogW
Const	-2.42 (5.02)	-3.70 (3.87)	3.62 (1.96)
LogW <sub>-1</sub>	-0.34 (0.24)	-0.34 (0.23)	
LogW <sub>-1</sub> - LogP <sub>-1</sub>			-0.13 (0.18)
DlogCU	0.67* (0.34)	0.57** (0.24)	0.85** (0.32)
Log CU <sub>-1</sub>	0.25 (0.24)	0.23 (0.23)	0.34 (0.24)
DlogP	0.41 (0.41)		0.47 (0.42)
Log P <sub>-1</sub>	0.22 (0.19)	0.19 (0.17)	
DlogP + DlogYL		0.28 (0.25)	
DlogYL	0.11 (0.47)		-0.33 (0.34)
LogYL <sub>-1</sub>	0.46 (0.62)	0.60 (0.51)	-0.30 (0.21)
LIBDUM	0.03 (0.10)	0.06 (0.06)	-0.03 (0.09)
Rsquared	0.18	0.23	0.13
DW	2.62	2.53	2.53
Obs	21	21	21

Coefficients with standard deviations in parenthesis

Significance at 10% \* and 5% \*\* level

**Table 4 – Aggregate demand and real wage**

	DlogI	DlogI	DlogCG	DlogCG	DlogI+CG	DlogIP+CG
Const	-0.35 (3.00)	-1.61 (2.04)	0.37 (1.44)	0.97 (1.28)	0.02 (1.20)	-0.13 (1.07)
Log I <sub>1</sub>	-0.36* (0.19)	-0.39** (0.16)				
LogCG <sub>-1</sub>			-0.47* (0.23)	-0.52** (0.21)		
Log I+CG <sub>-1</sub>					-0.16 (0.19)	-0.19 (0.19)
DlogGDP	1.70* (0.93)	2.68** (0.90)	1.37** (0.45)	1.32** (0.47)	1.65** (0.37)	1.76** (0.39)
LogGDP <sub>-1</sub>	0.48 (0.43)	0.48* (0.24)	0.30 (0.20)	0.42** (0.19)	0.19 (0.18)	0.20 (0.16)
DlogW/P	0.88 (0.92)		-0.21 (0.45)		-0.04 (0.36)	
LogW/P <sub>-1</sub>	-0.17 (0.53)		0.12 (0.28)		-0.03 (0.20)	
DlogWS		1.92** (0.80)		-0.17 (0.44)		0.19 (0.35)
LogWS <sub>-1</sub>		-0.01 (0.47)		0.26 (0.27)		0.10 (0.21)
LIBDUM	0.08 (0.27)	0.24 (0.23)	-0.03 (0.15)	0.02 (0.14)	-0.06 (0.11)	0.01 (0.11)
Rsqr-adj	0.29	0.45	0.41	0.44	0.56	0.57
DW	1.47	1.49	1.96	1.96	2.12	2.22

Coefficients with standard deviations in parenthesis

Significance at 10% \* and 5 % \*\* level

**Table 5 - Ratio of Basic Pay of Various Pay Categories**

Relative to median security guard

	1989	1993	1995	1997
<u>Executive</u>				
Chief executive	11.3	11.9	23.1	23.2
Technical/research executive	8.5	7.6	15.2	15.6
Marketing executive	8.1	6.9	14.6	15.1
Manufacturing executive	7.9	6.4	15.1	14.9
<u>General</u>				
Accountant - qualified 5-10yrs	6.3	4.7	7.8	5.1
Sales representatives - general (male)	2.5	3.0	3.1	2.2
Handyman	1.5	1.0	1.4	1.2
Security guard	1.0	1.0	1.0	1.0
Waitress/ teamaker	0.7	0.7	0.7	0.7

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Source: PE Consulting, Annual Survey of Salaries, various dates.

The growth rate is estimated by the slope of the line  $\ln y = a + bt$  fitted to the nominal data deflated by the consumer price index for 1988-1996

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