

USPEC

**DEPARTMENT OF ECONOMICS
UNIVERSITY OF THE SOUTH PACIFIC**

USPEC WORKING PAPER

**ECONOMIC IMPORTANCE OF THE SUGAR INDUSTRY IN FIJI:
SIMULATING THE IMPACT OF A 30 PERCENT DECLINE
IN SUGAR PRODUCTION**

By

PARESH KUMAR NARAYAN

Griffith Business School

Department of Accounting, Finance and Economics

Gold Coast Campus

Griffith University

PMB 50 Gold Coast MC

Queensland 9726

Australia

Telephone: +(617) 5552 8056

Fax +(617) 5552 8068

Email: P.Narayan@Griffith.edu.au

and

BIMAN C. PRASAD

Department of Economics

The University of the South Pacific

Suva, Fiji

Telephone: (679) 321 2568

Fax: (679) 327 0069

Email: chand_b@usp.ac.fj

No. 2004/12

July, 2004

USPEC WORKING PAPER SERIES

This working Paper series presents work in progress in the Department of Economics at the University of the South Pacific. Comments and criticisms should be addresses to the authors. Authors share equal responsibility for the paper. Copyright reside with the authors. Additional copies are available from:-

Ms Josephine Singh
Secretary,
Department of Economics,
USP,
Suva, Fiji

Email: singh_js@usp.ac.fj
Fax: (679) 327 0069 OR 330 1487

USP Library Cataloguing-in-Publication Data

Narayan, Paresh Kumar

Economic importance of the sugar industry in Fiji : simulating the impact of a 30 percent decline in sugar production/ Paresh K. Narayan and Biman C. Prasad. – Suva, Fiji : Economics Department, The University of the South Pacific, 2004.

22 p. ; cm. -- (Working paper / University of the South Pacific, Economics Department) ; 12(2004)

ISBN 982-01-0583-8

1. Sugar industry—Economic aspects—Fiji 2. Sugarcane industry—Economic aspects—Fiji I. Prasad, Biman C. II. The University of the South Pacific. Economics Department III. Working paper (The University of the South Pacific. Economics Department) ; 12(2004)

H9118.F5N27 2004

338.17361

Working Paper

No. 2004/12

July, 2004

**Economic Importance of the Sugar Industry in Fiji: Simulating the Impact
of a 30 Percent Decline in Sugar Production**

by

Paresh Kumar Narayan^{*} and Biman Chand Prasad[¥]

^{*} Department of Accounting, Finance and Economics, Griffith University

[¥] Department of Economics, The University of the South Pacific

Economic Importance of the Sugar Industry in Fiji: Simulating the Impact of a 30 Percent Decline in Sugar Production

ABSTRACT

In this paper we revisit the Fiji sugar industry with a fresh mandate. The century old industry, widely perceived as the backbone of the Fijian economy, is on the verge of collapse. Recognising this, the Fiji government and the Asian Development Bank have developed a reform plan, envisaged to bailout the ailing sugar industry. We concur with the reform plan but demur with the claim that sugar production will not be affected. We use the Fiji computable general equilibrium model to simulate the economy-wide impact of a 30 percent reduction in sugar production. Amongst our key results we find that Fiji's gross domestic product will fall by around 1.8 percent and real welfare will decline by some 1.5 percent. We draw several policy implications from our empirical results.

JEL classifications: D23; D58

Keywords: Fiji, sugar industry, reform, computable general equilibrium model

Introduction

The sugar industry has been the mainstay of Fiji's economy for the last 125 years. Started as a colonial strategy to promote economic growth, the industry has grown over the years to become the leading industry. After independence in 1970, Fiji pursued an inward-looking import-substitution strategy for growth in agriculture and manufacturing. However, sugar production was the only key export in the economy. Sugarcane farming drove the development agenda for Fiji since then. The relatively high rates of economic growth in the 1970s were as a result of Fiji's booming sugar exports. While Fiji has adopted tourism and export-led manufacturing strategy for the last decade as the basis for its economic growth, sugar exports still drive the rural economy where the bulk of the population resides. Currently sugar production contributes about 7 percent of gross domestic product (GDP) and generates 22 percent of total exports. It accounts for 8.5 percent of total foreign earnings and generates direct and indirect employment for about 51,000 people (Government of Fiji, 2002). The government in its strategic development plan for 2003-2005 has put forward a number of policy objectives. These include:

- the restructure of the sugar industry into a commercially viable and efficient industry;
- improving the milling efficiency and introduction of cane quality payment system; and
- improving the efficiency of sugarcane production, diversification of production into a range of sugar by-products and initiating long term reforms to make the sugar sector internationally competitive.

(Government of Fiji, 2002).

However, over the last decade the sugar industry has been experiencing problems relating to non-renewal of sugarcane land leases and expiring benefits under the trade agreement (see the next section for an overview). In the light of the declining performance of Fiji's sugar industry, the goal of this paper is to exam the impact of the sugar industry on Fiji's economy. To achieve this goal we use the computable general equilibrium model, which is at the forefront of research on "impact studies". The balance of the paper is organized as follows. In the next section we provide an overview of Fiji's sugar industry and draw the main motivation for this study. The methodology is presented in Section 3, while the simulation results are presented in Section 4. In the final section we conclude with some policy implications.

2. An overview of sugarcane production in Fiji

2.1. Trends in sugarcane production

Throughout out the first twenty years after independence, the objective of successive governments in Fiji has been to stimulate sugar cane production, for, from its inception, it was believed that this was needed to provide Fiji the economic stimulus required for development. Sugar cane production increased from approximately 2 million tonnes in 1976 to an estimated 4 million tonnes in 1980. In the corresponding period sugar output was 272,000 tonnes and 475,000 tonnes, respectively. Between 1981 and 1990 sugar cane production averaged nearly 3.6 million tonnes and sugar output averaged 416,800 tonnes. Sugar output reached an all-time peak of just over 500,000 tonnes in 1986, nearly approaching the target of 550,000–600,000 tonnes projected in Fiji's Ninth Development Plan (DP9) for 1986–1990. Meanwhile, sugar production averaged 439,000 tonnes during the

period 1990 and 1995, an increase of more than 50 percent compared to 1973–1975, the period immediately after localization of the industry but prior to the ‘expansion programmes’. The ‘expansion programme’ included the opening up of new sugar cane growing areas such as the Seaqaqa project on the Island of Vanua Levu. Funding was provided to prospective farmers in the form cheaper loans through Fiji’s development bank. Between 1995 and 2002 the average sugar cane production was 3.6 million tonnes. However, the average declined further to 3.3 million tonnes between 2000 and 2002. Correspondingly, the average raw sugar production between 1995 and 2002 was 357,750 tonnes but declined to an average of 321,000 between 2000 and 2002.

The decline in sugarcane production and sugar output can be attributed to the existing major problems in the industry. These include the non-renewal of land leases for the sugar cane farmers, the impending expiry of preferential prices from the European Union and the rising level of inefficiency in sugar production, milling and transportation. To circumvent these problems, the government together with other industry stakeholders has initiated a restructuring plan. However, it is contended that it does not matter how the industry is restructured, the level of sugarcane production is likely to decline (Narayan, 2003). Everyone, however, does not share this view. For example, the Asian Development Bank has projected that while some inefficient farmers may leave the industry those remaining are likely to maintain at least the current level of production (Lincoln International, ADB, 2003). However, one shortcoming of the ADB report is that it does not take into account the fact that efficient farmers would also be exiting the industry because of the non-renewal of leases. Rather it erroneously assumes that land leases would be available to those farmers who are efficient. The ADB further projects that the number of farmers is likely to decrease while production of sugar cane and sugar is likely to increase (see Table 1). The projection in Table 1 assumes three things: first, that leases will be renewed for those who wish to remain in sugarcane farming; second, that because of the erosion of preferential prices, smaller and inefficient farmers will be weeded out; and third, that the remaining and bigger farmers will increase productivity to meet the short fall from those who would be leaving. For example, it is projected that in 2008 there would be only 12,500 productive farms. In 2003, it is projected that with 21,371 farms, 2.8 million tonnes of cane and 293,200 tonnes of sugar will be produced. The average production per farmer for 2003 would be 131 tonnes. Even, if we take just the 17,297 productive farms in 2003, the average production per farm is only 162 tonnes. Given this, the 2008 projection of 3.6 million tonnes from 12,500 farms seems highly unrealistic.

The average production of sugar cane per farm is projected to be 288 tonnes in 2008. This represents an average increase in sugar cane production per farm of 77 percent compared to 2003. This represents a phenomenal increase in farm efficiency, which is not expected to be realised given the problems with respect to new leases and new farmers. According to Table 1, the ADB predicts a 29 percent increase in total sugar cane production and 51 percent increase in sugar production over the 2003-2008 period. These figures are alarming when viewed in line with the ADB’s projections on total productive farms and hectares of cane harvested. For instance, it is projected that over the 2003-2008 period total productive farms will decline by 38 percent while hectares of cane harvested will fall by 28 percent. The ADB report does not explain how, in the face of declining productive farms and hectares harvested, a 29 percent increase in sugar cane and a 51 percent increase in sugar can be achieved.

Table 1: Projected Production and Farmer Numbers as a result of Reform in the Industry

Crop Year		2003	2004	2005	2006	2007	2008
Hectares Harvested		64,000	61,500	58,500	56,000	53,000	50,000
Yield TC/HA		43.8	47.2	53.8	60.7	64.2	72.0
Tonne Cane 000's		2,800	2,900	3,200	3,400	3,400	3,600
Overall Time Efficiency %		73.0	75.0	75.0	75.0	82.5	84.0
Overall Recovery %		81.0	81.0	85.0	85.0	85.0	85.0
TC/TS		9.58	8.67	8.69	8.22	8.02	8.15
Tonnes Sugar		293.2	303.7	371.7	394.9	394.9	441.7
Total Farmers		21371					
Total Productive Farms		17,297	16,622	15,658	14,000	13,250	12,500
Ave Farm Size Ha's		3.7	3.7	3.8	4.0	4.0	4.0
Farmers exiting		4,074	676	964	1,658	750	750
Total farmers exiting 2004-2008							4,798

Source: Lincoln International, ADB TA, 2003:8.

Perhaps the most likely scenario is if productivity in the post-2003 period remains at the 2003 level, then in 2008 production is likely to decline to 2 million tonnes of cane. This still reflects a decline in sugar cane production of about 40 percent. Given the slow pace of reform and the impending problem with the land leases, it is highly unlikely that ADB's projection will be met. Furthermore, the ADB is probably not aware that Indigenous Fijian farmers, who will be entering the industry in greater numbers but do not have the experience in sugarcane farming, will not be able to match production levels of those experienced farmers, mainly Indian Fijians who would be leaving sugarcane farming due to the expiry of land leases (Prasad and Tisdell 1996, Verebalavu 1998 and Reddy, 1998). The Indo-Fijians on average have always had higher levels of production than their Fijian counterparts (see table 2). One of the reasons given for this difference includes lack of support for Fijian farmers in terms of management of farms. From the projected figures presented in Table 1, it is clear that these factors are implicitly reflected in the decline in hectares of cane harvested and productive farms. However, the projected increase in sugar cane and sugar remains a puzzle.

Table 2: Cane yield by Ethnic Group in Fiji: 1984-1996

	Fijian	Indo-Fijians	Other	All races
Freehold	48.5	60.2	59.2	60.1
Crown lease	51.2	62.3	62.1	62.0
Native Lease	49.5	59.5	43.7	57.4
Vakavanua	52.2	54.7	54.9	52.3
All lease types	50.5	60.3	52.2	58.4

Source: Lal et al, 2001:18.

The ADB report projects that production will remain at the same level or increase; this is based on the assumption that farmers who remain will become more efficient. This may be an oversimplification of the issues affecting the industry. Even if one assumes that remaining farmers will become more efficient there is no guarantee that production will increase.

We believe that the predictions of the Fiji Sugarcane Growers Council (farmers representative) is more reliable. They predict that if the land leases are not renewed and the restructure of the industry does not take place soon, then more than 30 percent production

decline could be experienced in the next 3 years. In this paper our aim is to examine the economic impact of a reduction in sugar cane productivity on Fiji's economy. To achieve this aim we use the computable general equilibrium (CGE) model of the Fiji economy. The rest of the paper is set out as follows. In the next two sections we provide an overview of the nature of property rights in land in Fiji and the reform of the Fiji sugar industry. This is followed by the theoretical structure of the Fiji CGE model. The penultimate section presents the simulation results while the final section concludes with some policy implications.

2.2. *The Reform of the Sugar Industry*

The process of reform in the sugar industry is part of the bigger agenda of economic reforms that Fiji has pursued since the mid 1980s. The military coups of 1987 caused serious economic decline and the whole viability of the import-substitution policies pursued by Fiji since 1970 could not be sustained (Akram-Lodhi, 2000). Market-led reforms driven by the world economic environment provided Fiji with the impetus to change its economic policies. The main thrust of the policies since the mid 1980s has been to promote exports as a strategy for economic growth (Kumar and Prasad, 2002). The provision of incentives for other manufacturing sectors such as garments has been in addition to manufacturing and export of sugar.

The restructuring of the sugar industry is premised on two fundamental problems in the industry. First, the bulk of Fiji's sugar is sold to the European Union under a preferential price agreement, where the sugar price received by farmers in Fiji is about three times the world market price. The sugar protocol of the Lome Convention allows seventeen countries in Africa, the Caribbean and the Pacific preferential access to the EU market. The sugar protocol has been extended under the new Cotonou agreement. This agreement is expected to conclude in 2008 as per World Trade Organisation (WTO) requirements. The increase in the quantity of sugar produced over the years is a direct result of the preferential price under the guaranteed market. While Fiji has a fixed quota under the agreement, there has been some variation over the years with respect to the amount of sugar sold under preferential prices.

Special access to the European Union market has determined Fiji's sugar industry policies over the last 30 years. This is also the case in many other sugar producing countries such as Cuba, the Philippines and Zimbabwe (Larsen and Borell, 2001). Fiji's current Master Award, which came into existence in 1989, sets the guidelines for sharing proceeds between the millers and the growers. Under the Master Award growers receive 70 percent of the proceeds while the millers get 30 percent. While there have been conflicts between the millers and growers in the past, the situation has never been as serious as it is at present. First, the mills are owned by the government and like many public enterprises in developing countries, the sugar mills in Fiji have been poorly managed and have become very inefficient (Prasad, 2002). As pointed out by Larson and Borrell (2001) most sugar producing countries are undertaking reform of the industry and they each have their unique problems with respect to production of sugar cane, manufacturing and marketing of raw sugar.

Since 2000, both sugar cane and sugar production have been falling. For example, there was a decline in sugar cane production of 9 percent and 13 per cent respectively in 2000 and 2002. This trend is likely to continue in the future given the problems with respect to property rights in land and the impending expiry of preferential prices in 2008. To address this issue the stakeholders in the industry, including government, which owns the four sugar mills in the country, have put in place a plan for restructuring the industry. The main thrust of the

restructuring plan is to increase the efficiency of the sugarcane farms, transportation system and milling so as to advance Fiji's competitiveness in the international market when the preferential prices ends in 2008. The need for restructuring is summarised by the ADB and Government of Fiji Islands (ADBGFI: 2003:1) as follows:

The combination of deteriorating world sugar market prices, declining efficiencies in all sections of the Fiji sugar sector, and the adverse effects of the Master Award which results in an inequitable distribution of Fiji sugar proceeds that does not permit reinvestment in the sugar sector's infrastructure, has resulted in a situation that dictates and immediate restructure of the Fiji sugar sector. Without immediate restructuring, either the Fiji Sugar Corporation (FSC) will have to cease production, due to its technical insolvency and declining credit rating, or the government of the Fiji Islands will have to provide an immediate cash injection to FSC of up to F\$33 million to ensure continuing operation of the four mills for 2003-2004. Future annual cash injections can be expected to rise as the deteriorating sugar sector infrastructure maintenance and replacement costs escalate.

The restructuring plan put forward by the stakeholders in the sugar industry including the government, millers and growers envisage a smaller industry in terms of the number of farmers (Sugar Industry Restructure Committee, 2003). The plan also envisages that production will be maintained at a level, which would still contribute significantly to the economy. However, the problem with the land leases and the lack of agreement on the proposed restructuring will continue to cause production to decline. For example, between 2003 and 2005 more than 7,492 native land leases are expected to expire. Non-indigenous farmers hold all these leases. If we accept the current trend of non-renewal of leases then it is reasonable to assume that about 27 percent of the land under sugarcane will be removed from the tenants. This is consistent with the Fiji Sugar Cane Growers Council predictions for at least a 30 percent production decline over the next 3 years.

3. Methodology: Theoretical Structure of the Fiji CGE Model

The Fiji CGE model developed by Levantis (1999) and extended by Narayan (2004) is based on the ORANI model of the Australian economy and consists of $m=35$ domestic industries, $n=34$ commodities and $q=2$ occupational types. There are 13 agricultural sector industries; 10 industrial sector industries and 12 service sector industries including hotels, cafes and restaurants. Each commodity corresponds to an industry except for gold, which is split into two different industries because of the different cost structures of the industries. Of the 34 commodities, most have competing imports. In this light, the model adheres to the Armington assumption which takes imports to be imperfect substitutes to domestic goods. A full list of the 35 industries and 34 commodities is given in Appendix 1. The 'comparative static' nature of the model implies that it provides projections at only one point in time, which is the solution year. The model refers implicitly to the economy at some future time period to ensure that the economy adjusts after the initial shock(s). Schematically, the model takes the following form:

$$F[Z_1(t), Z_2(t), Z(0)] = 0$$

Here, $Z_1(t)$ and $Z_2(t)$ are vectors of values of endogenous and exogenous variables at time t and $Z(0)$ is a vector of initial conditions. At the economy wide level, the equations of a typical Johansen model can be classified into five groups:

1. equations that describe household and other final demand for commodities;
2. equations that describe industry demand for primary factors and intermediate inputs;
3. equations that describe prices;
4. market clearing equations for primary factors and commodities; and
5. other equations, e.g. equations defining GDP, aggregate employment, the consumer price index and investment price index.

The equations of the model are derived from neoclassical microeconomic assumptions about the behaviour of price taking economic agents. Put differently, consumers maximise utility subject to their budget constraints and producers choose their inputs so as to minimise costs of production. Resources are limited and hence are distributed by market forces, and market imperfections can lead to unemployment. Increasing government expenditure is contingent on raising taxes or borrowing, which has implications for other economic agents such as consumers and firms, which in turn induce other economic effects. The economy is linked to the rest of the world via a foreign exchange market. An increase in exports in one sector leads to a rise in the exchange rate, hence, discouraging other exports and encouraging imports. The model is solved using the GEMPACK software package, developed by the Centre of Policy Studies and the Impact Project, Monash University.

3.1. *Model Closure and Solution*

The closure of a model requires a statement separating the exogenous and endogenous variables. To realise the long-run impact, the conventional wisdom is that capital is mobile between industries in response to changes in rates of return. This assumption is consistent with the fact that Fiji faces an elastic supply of capital from the world market, i.e the domestic rate of return is assumed to be determined by the world market rate. By holding the after tax rate of return in each industry fixed we allow an industry to increase its quantity of capital stock in the event that the cost of capital falls. Notice that if the rate of return is endogenous, in the face of falling cost of capital, there will be an improvement in the rate of return. The exogenous nature of the rate of return on capital implies that a rise in investment levels is needed to build and maintain industry capital – extra capital, here, will add to output. The exogenous nature of rate of return on capital also implies that if changes in economic conditions exert growth in some industries, they will attract investment expenditure and *defacto* attract capital from other industries. This behaviour ensures that when all inter-industry adjustments have taken their course, capital in all industries earns a uniform rate of return.

With regards to the labour market, employment levels are largely fixed in the long-run. It follows that if real wages are endogenous then either employment or unemployment must be fixed. We hold employment fixed. In the traditional wage-labour setting, the supply curve for labour for each industry and occupation is *defacto* horizontal. This implies that shifts in the demand for labour will be equilibrated with appropriate adjustments in the wage rate.

With employment growth fixed, the rates of growth of the aggregate capital stock and real GDP are determined. Meanwhile, on the expenditure side, fixing capital growth drives real investment growth via the model's capital-accumulation relationships. The trade balance adjusts to enforce the exogenous setting of the exchange rate. Real public consumption is fixed. Subsequently, real private consumption is implied from the GDP identity.

4. Simulation Results

Table 3 presents the key macroeconomic impacts of a 30 percent reduction in sugar productivity in Fiji. The impact on GDP and exports is profound. Real GDP, for instance, will fall by 1.85 percent and this is significant given that Fiji's growth rate over the last decade has averaged only 2.8 percent.

Table 3: Macroeconomic effects for Fiji from a 30 percent reduction in sugar output

Variables	percent change
Private savings	-2.6796
Balance of payments	-F\$703,043
Total government consumption	-1.8761
Total government investment expenditure	-0.8924
Total government savings	-26.5760
Imports	-1.6652
Exports	-2.1434
Consumer price index	-1.0763
Investment price index	-0.8237
Private disposable income	-2.6796
VAT revenue	-1.0436
Income tax revenue	-2.9898
Company tax revenue	-3.0141
Production tax revenue	-6.2675
Excise tax revenue	-2.5254
Tariff revenue	-1.5425
Real GDP	-1.8467
GDP deflator	-0.7160
Real consumption	-1.6466
Real national welfare	-1.4690

Labour market effects for Fiji from a 30 percent reduction in sugar output	
Variables	percent change
Net after tax rural wage rate for unskilled labour	-1.8776
Net urban wage rate for unskilled labour	-1.0763
Wage rate for informal sector labour	-7.1587
Aggregate demand for informal unskilled labour	3.7379

Exports, on the other hand, will decline by 2.1 percent and imports will decline by 1.7 percent. This will contribute to a deterioration of the balance of payment for Fiji.

Another very important result is the impact on tax revenue for the government from declining sugar production. The value added tax (VAT) revenue will decline by about 1 percent followed by a decline in the income tax revenue of about 3 percent. The biggest decline will be in the company tax and production tax revenues, representing 3 percent and 6 percent respectively.

The sugar industry has a bigger multiplier effect than most other industries in Fiji (Narayan, 1999). It is, therefore, expected that a shock in the sugar industry will have a direct impact on other sectors of the economy. Table 4 reports the real output effects of a 30 percent decline in the sugar output. While the hotel and transport sectors will benefit (the reasons for this will be established later) most other sectors will experience a decline in output. The decline in the

outputs of dalo, root crops, Kava, fruit and vegetables, dairy and livestock will be more than 1 percent.

This decline could be explained in two ways. First, the demand for these crops from the sugarcane farming community will decline. This is because while many farmers do not grow these crops they are part of their daily household consumption. Furthermore, during the sugarcane harvesting season, the demand for these crops is even higher, as they form the bulk of the food for labourers harvesting cane. Third, the commercial and business activities in at least four major urban centres in Fiji are largely driven by sugarcane farming activity. Hence, it follows that any decline in production is likely to affect economic activity in the urban areas. Consequently, there would be a reduction in demand for agricultural products. There is also significant decline in the beverage and tobacco sector. Of more concern is the decline in electricity and water, construction, finance and insurance where, output decline will be between 1-2 percent. These sectors together contribute 15 percent to GDP, implying that reduction in their output will be reflected in the GDP. The most important social sectors, that is, education and health will suffer a decline of 2.7 percent and 2 percent respectively. The impact on the informal sector will be the largest, amounting to 3.4 percent.

Table 4: Real output effects for Fiji from a 30percent reduction in sugar output

Variables	percent change
Hotels	2.0169
Transport	1.2054
Commerce	-1.4891
Dalo	-1.0374
Root crops	-1.7961
Kava	-1.5571
Fruits and vegetables	-1.2209
Dairy	-1.1992
Livestock	-1.4343
Beverage and tobacco	-2.3741
Electricity and water	-2.4094
Construction	-1.3899
Finance	-2.6732
Insurance	-1.2192
Property services	-2.8516
Business services	-0.8516
Other private services	3.1779
Health	-2.0105
Education	-2.6769
Informal	-3.3907
Rice	-0.8314
Quarry	-1.5548
Other crops	-1.1552
Coconuts	0.4919
Ginger	0.5300
Cane	-15.0111
Fishing	0.0839
Processed food	0.6855
Textiles clothing and footwear	0.7683
Other manufactures	0.6535

The impact on the textile and footwear sector, which gained prominence in Fiji as providing low wage and labour intensive industries, will be positive but less than 1 percent. Other manufactures will experience an increase but again these will be small in magnitude.

The export effect of a 30 percent reduction in sugar production on other export crops such as dalo, kava, fish, gold, coconuts and ginger will be positive (see Table 5). However, ginger and gold exports will increase by less than 1 percent. Dalo and kava show potential in that the increase will be more than 2 percent. Textiles, clothing and footwear exports will increase modestly and remain less than 2 percent.

Table 5: Export effects for Fiji from a 30 percent reduction in sugar output

Variables	percent change
Coconuts	1.0133
Ginger	0.4958
Dalo	2.4202
Kava	2.7073
Fish	1.2346
Gold	0.6754
Sugar	-37.8016
Processed food	7.8114
Textiles, clothing and footwear	1.7480
Other manufactures	2.2591
Hotel	3.1811
Transport	1.9139
Other private services	19.4257
Commerce	12.6526

The average prices of all the commodities will experience a decline and in some cases (beverages and tobacco) it will be between 4 and 5 percent. This is expected: as sugar export earnings decline, the exchange rate is likely to depreciate and therefore domestic prices of goods and services are expected to decline. The price effect is consistent with the results in table 3 where wages in both rural and urban areas will decline by more than 1 percent. The brunt of the wage decline will be felt in the informal sector. Again this is consistent with the decline in income resulting from declining wages, and increasing exports of some of the traditional crops such as kava, dalo and other manufactures.

The widely held view amongst policy makers in Fiji is that the tourism industry has the potential to compensate for the collapse of Fiji's sugar industry and lead economic growth in Fiji (Budget Address, 2003). This may be one reason why the problems in the sugar industry have not been given much prominence until it became very obvious that the industry will collapse. Here, we provide a glimpse of the reaction of Fiji's tourism industry in the event of a contraction in Fiji's sugar industry. The results on Fiji's tourism industry from a 30 percent reduction in sugar productivity are presented in Table 6. We find that tourism prices will decline which will boost tourism exports. However, an important result here is that the growth in tourism exports will not be big enough to compensate for the contraction in sugar exports and exports of other sectors. Notice that, overall, a 30 percent reduction in sugar productivity results in a balance of payments deficit (see Table 3).

Table 6: Impact on Fiji's tourism industry from a 30 percent reduction in sugar output

Tourism prices in Fiji for visitors from:	
Country	percent change
Australia	-0.2105
New Zealand	-0.2199
United States	-0.1969
Tourism exports by country:	
Country	percent change
Australia	0.6275
New Zealand	0.4742
United States	0.2822
Tourism exports as a percent of:	
Variables	percent change
Total tourism exports	1.9784
Total exports	1.0355
GDP	0.3375

5. Conclusions and policy implications

The sugar industry in Fiji is at the crossroads. There are a number of problems that beset the industry such as the impending expiry of preferential European Union sugar prices, the non-renewal of land leases and the milling and transportation inefficiencies. The belief that the sugar industry will collapse if existing problems are not addressed prompted the Asian Development Bank and the Fiji Islands Government (ADBFG) to draw a reform plan for the industry. While we concur with the reform plan we find the projections of the ADBFG unrealistic. The ADBFG is of the view that sugar production will not be affected despite the industry's problems. It is difficult to reconcile their predictions for a 29 percent increase in sugar cane and 51 percent increase in sugar productions against the projections of a 38 percent decline in total productive farms and a 28 percent decline in hectares of cane harvested. This also goes against the projections of the Fiji Sugar Cane Growers Council (FSCGC) who predict a 30 percent reduction in sugar production, a reasonable and reliable prediction given the dire situation of the industry. In this paper we explain the reasons for the overoptimistic views of the ADBFG. We reason that the projections are made on unrealistic assumptions. Given this we strongly believe, consistent with the current trends, that sugar cane and sugar outputs will fall. In fact, this has been the trend over the last 7-8 years. Sugar cane production, for instance, fell by 16.7 percent and sugar output fell by 27 percent between 1995 and 2002. Consistent with the falling trend in output and the projections of FSCGC and Narayan (2003a) we simulate the economy wide impact of a 30 percent reduction in sugar production in Fiji.

The empirical results from the CGE model show that a decline in the sugar production will have a deleterious impact on Fiji's economy. For instance, real GDP will decline by about 1.8 percent, negatively affecting government's tax revenues. The decline in sugar production will also have a negative impact on the nation's welfare. This is reflected in the declining levels of wages in other sectors of the economy as well. The decline in wages in the informal sector by more than 7 percent is of particular concern. The result can be explained by the fact that the contribution of the agricultural sector in Fiji declined from 22 percent in 1990 to 16 percent in 2000 concomitant with a 10 percent increase in urbanisation (ADB, 2002). However, the urban manufacturing sector's contribution to GDP increased only marginally. Therefore, the

informal sector has been the natural absorber of the labour released from the agricultural sector. Within the sugar industry, it is expected that by the year 2008 some 5,000 families will abandon sugarcane farming if leases are not renewed. The resulting increase in unemployment in the informal sector signals a major social problem, which will be a burden on both government resources and resources of the community.

This study has made a significant contribution to the understanding of the importance of the sugar industry to Fiji's economy. In this light, it is dangerous to play down the importance of the industry, as we believe has been done by the ADBFG. Our study clearly shows that the sugar industry is still vital to the national well-being of Fiji. It provides evidence that a decline in sugar production is likely to have significant negative consequences on most sectors of the economy. This study should dispel the view that there are real alternatives to the sugar industry in the short to medium term. Sugar industry reform must therefore be carefully implemented so that there are alternatives to farmers who, on current evidence, are likely to be forced out of the industry as a result of the reforms. A longer time frame will be required to allow the transition to a more urban-based manufacturing sector in a less painful manner.

References

Asian Development Bank (2002) *Key Indicators 2002: Population and Human Resource Trends and Challenges*, ADB: Manila.

Asian Development Bank (2003) *Intermediation of Sugar Sector Restructuring*, Draft Report, ADB and Government of Fiji: Suva.

Asian Development Bank (2003) *Alternative Livelihoods Project: Mid-Term Report*, TA No. 3887-FIJ: Lincoln International Ltd: Suva.

Borrell, B. and Larson, D.F. (2001) *Sugar Policy and Reform*, World bank Country Economics Department, World Bank, Washington D.C.

Chand, S. (1998) "Current Events in Fiji: An Economy Adrift in the Pacific", *Pacific Economic Bulletin*, 13, pp. 1-17.

Codsi, G. and K. R. Pearson (1988) "GEMPACK: General Purpose Software for Applied General Equilibrium and Other Economic Modellers", *Computer Science in Economics and Management*, 1, pp. 189-207.

Cooper, R., K. McLaren and A. Powell (1985) "Macroeconomic Closure in Applied General Equilibrium Modelling: Experiences from ORANI and Agenda for Further Research" in J. Piggot, and J. Whalley, (eds) *New Developments in Applied General Equilibrium Analysis* (New York: Cambridge University Press).

Dixon, P.B., B.R. Parmenter, J. Sutton. and D.P. Vincent (1982) *ORANI: A Multisectoral Model of the Australian Economy*, (Amsterdam: North-Holland).

Horridge, J.M., B.R. Parmenter and K.R. Pearson, (1993) "ORANI-F: A General Equilibrium Model of the Australian Economy", *Economic and Financial Computing*, 3(2), pp. 71-133.

Levantis, T. (1999) *The CGE Model of the Fiji Economy: A Working Manual*, National Centre for Development Studies, Australian National University.

Johansen, L. (1960) *A Multi-sectoral Study of Economic Growth* (Amsterdam: North Holland).

France, P. (1969) *The Charter of the Land: Custom and Colonization in Fiji*, Oxford University Press: Melbourne.

Government of Fiji (2002) 'Rebuilding Confidence for Stability and Growth for a Peaceful, Prosperous Fiji', Strategic Development Plan 2003-2005, August 2002, Government Printer, Suva.

Government of Fiji. (1985). *Laws of Fiji*: Chapter 134, Government Printer: Suva.

Government of Fiji. (1978). *Laws of Fiji*, Government Printer: Suva.

Government of Fiji. (1976). *Laws of Fiji*, Chapter 270, Government Printer: Suva.

Kumar, S. and Prasad, B. (2002) "Fiji's Economic Woes: A Nation in Search of Development Progress, *Pacific Economic Bulletin*, Vol. 17, No. 1

Lal, P., Lim-Applegate, H. and Reddy, M. (2001) ALTA or NLTA What's in the name- Land tenure Dilemma and the Fiji Sugar Industry, paper presented at the Australian Agricultural and Resource Economics Society Conference, AARES 2001, 22-25 January 2001, Adelaide South Australia.

Moynagh, M., (1981) *Brown or White: A History of the Fiji Sugar Industry, 1873-1973*, Australian National University: Canberra.

Ministry of Finance and National Planning (2002) *2003 Budget Address: Securing Sustained Growth*, Suva.

Narayan, P.K., (2003a) An Econometric Model of Tourism Demand and a Computable General Equilibrium Analysis of the Impact of Tourism: The Case of Fiji Islands, Unpublished PhD Dissertation, Department of Economics, Monash University.

Narayan, P.K., (2003b) An Empirical Analysis of Sugarcane Production in Fiji, 1970-2000, Economic Policy and Analysis (in press).

Nayacakalou, R. (1971) "Fiji: Manipulating the System", in Crocombe, R. (ed.) *Land Tenure in the Pacific*, Oxford University Press: Melbourne.

NLTB,(1995) *Vanua*, Native Land Trust Board Annual Report: Suva.

Overton, J. (1994) "Land Tenure and Cash Cropping in Fiji", in R. Crocombe and M. Meleisea, (eds) *Land Issues in the Pacific*, Institute of Pacific Studies and Macmillan Brown Centre for Pacific Studies: Canterbury.

Prasad, B. (2003) "Sugar Restructuring", Friday, 21 February, *Fiji Times*.

Prasad, B. and Kumar, S. (2000) "Institutional Rigidities and Economic Performance in Fiji", in A.H. Akram-Lodhi (ed.), *Confronting Fiji Futures*, Asia Pacific Press: Canberra.

Prasad, B.C. & Tisdell, C. (1996) "Institutional Constraints to Economic Development: The Case of Native Land Rights in Fiji", *Asia Pacific Development Journal*, Vol, pp.

Reddy, M. (1998) Production Economic Analysis of Fiji Sugar Industry, PhD dissertation, University of Hawaii, Honolulu (unpublished).

Verebalavu, J. (1998) Indigenous Fijians in Business- A study of cane farmers, Unpublished Masters Thesis, The University of the South Pacific.

Ward, M. (1965) *Land Use and Population in Fiji, A Geographical Study*, Her Majesty's Stationery Office: London.

Ward, M. (1965) "Land, Law and Custom: Diverging Realities in Fiji", in Ward, R.G. and Kingdon.E (eds) *Land, Custom and Practice in the South Pacific*, Cambridge University Press: Cambridge.

APPENDIX

Appendix 1: List of industries and commodities in the Fiji model

Industry	Commodity
Sugarcane	Raw sugar
Coconuts	Coconuts
Rice	Rice
Ginger	Ginger
Dalo	Dalo
Root crops	Root crops
Kava	Kava
Fruit and vegetables	Fruit and vegetables
Other crops	Other crops
Dairy	Dairy
Livestock	Livestock products
Forestry	Forest products
Fishing	Marine products
Emperor gold mine	Gold
Mt Kasi gold mine	Gold
Quarrying	Quarrying
Sugar manufacturing	Sugar products
Beverages and tobacco	Beverage and tobacco
Food processing	Processed foods
Clothing, footwear and textiles	Clothing, footwear and textiles
Other manufactures	Other manufactures
Electricity and water	Electricity and water
Construction	Construction services
Commerce	Retail/wholesale services
Hotels, cafes, restaurants	Hotels, cafes, restaurants
Transport and communication services	Transport and communication services
Finance	Financial services
Insurance	Insurance services
Property services	Property services
Business services	Business services
Other private services	Other private services
Health	Health services
Education	Education services
Other government services	Other government services
Non-farm informal sector	Informal services

Working Paper Series

- 2004/wp: 10 Khainhaiya L. Sharma, *Growth, Inequality and Poverty in Fiji Islands: Institutional Constraints and Issues.*
 9 B. Bhaskara Rao, *Testing Hall's Permanent Income Hypothesis for a Developing Country: The Case of Fiji.*
 8 Azmat Gani, *Financial Factors and Investment: The Case of Emerging Market Economies.*
 7 B. Bhaskara Rao, *The Relationship Between Growth and Investment.*
 6 Wadan Narsey, *PICTA, PACER and EPAs: Where are we going? Tales of FAGS, BOOZE and RUGBY*
 5 Paresh Narayan & Biman C. Prasad, *Forecasting Fiji's Gross Domestic Product, 2002-2010.*
 4 Michael Luzius, *Fiji's Furniture and Joinery Industry: A Case Study.*
 3 B. Bhaskara Rao & Rup Singh, *A Consumption Function for Fiji.*
 2 Ashok Parikh & B. Bhaskara Rao, *Do Fiscal Deficits Influence Current Accounts? A Case Study of India.*
 1 Paresh Narayan & Biman C. Prasad, *The Casual Nexus Between GDP, Democracy and Labour Force in Fiji: A Bootstrap Approach.*
- 2003/wp: 11 B. Bhaskara Rao & Rup Singh, *Demand For Money in India: 1953-2002.*
 10 Biman C. Prasad & Paresh Narayan, *Fiji Sugar Corporation's Profitability and Sugar Cane Production: An Econometric Investigation, 1972-2000.*
 9 B. Bhaskara Rao, *The Nature of The ADAS Model Based on the ISLM Model.*
 8 Azmat Gani, *High Technology Exports and Growth – Evidence from Technological Leader and Potential Leader Category of Countries.*
 7 TK Jayaraman & BD Ward, *Efficiency of Investment in Fiji: Results of an Empirical Study.*
 6 Ravinder Batta, *Measuring Economic Impacts of Nature Tourism.*
 5 Ravinder Batta, *Ecotourism and Sustainability.*
 4 TK Jayaraman & Rajesh Sharma, *Determinants of Interest Rate Spread in the Pacific Island Countries: Some Evidence From Fiji.*
 3 T.K. Jayaraman & B.D. Ward, *Is Money Multiplier Relevant in a Small, Open Economy? Empirical Evidence from Fiji.*
 2 Jon Fraenkel, *The Coming Anarchy in Oceania? A Critique of the 'Africanisation' of the South Pacific Thesis.*
 1 T.K. Jayaraman, *A Single Currency for the South Pacific Islands: A Dream or A Distant Possibility?*
- 2002/wp: 8 Biman C. Prasad & John Asafu-Adjaye, *Trade Liberalisation and Environment in Pacific Forum Island Countries (FICs): Is it a case of "Two Gains For One"?*
 7 T.K. Jayaraman, *A Single Currency for the Melanesian Island Countries in the South Pacific: A Stepwise Approach.*
 6 Biman C. Prasad & Paresh Narayan, *Productivity Differential and the Relationship Between Exports and GDP in Fiji: An Empirical Assessment Using the Two Sector Model.*
 5 Gyaneshwar Rao, *Fiji Exports to Australia and New Zealand under SPARTECA Agreement.*
 4 Jon Fraenkel, *An Introduction to the Economic History of the Pacific Islands.*
 3 Biman C. Prasad, *Trade Liberalisation in the South Pacific Forum Island Countries: A Panacea for Economic and Social ills?*
 2 Rick Hou & T.K. Jayaraman, *Central Bank Cooperation and Coordination in the Pacific Islands.*
 1 T.K. Jayaraman & B.D. Ward, *Impact of Financial Sector Reforms and Stability of Money Demand Function in Samoa.*
- 2001/wp: 6 T.K. Jayaraman, *Financial Sector Reforms in the South Pacific Island Countries.*
 4 Sunil Kumar & Biman Prasad, *Savings and Investment Funds: Implications for Economic Growth in Fiji.*
 3 J. Andeng & T.K. Jayaraman, *Vanuatu's Monetary Sector: Demand for Money and Role of Monetary Policy: An Econometric Analysis.*

- 2000/wp:
- 2 Oskar Kurer, *ALTA and Rent: Who Exploits Whom?*
 - 1 R. Sathiendrakumar, *Importance of Marine Tourism and Environmental Protection: In Some Selected Indian Ocean Islands.*
 - 4 T.K. Jayaraman, *Monetary Policies In The South Pacific Island Countries: Past Trends And Future Directions.*
 - 3 Umesh Chand, *Employments and Earnings in Fiji's Public Health Sector.*
 - 2 Philip Szmedra, *What Price Agricultural Productivity? Pesticides and the Health of Sugar Farmers in Fiji*
 - 1 T.K. Jayaraman, *Does Money Matter in the South Pacific Island Countries, Some Empirical Evidence.*