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An econometric model of the determinants of private investment and a CGE model of the impact of democracy on investment and economic growth in Fiji

Paresh Kumar Narayan
Faculty of Business and Law, School of Accounting, Economics and Finance, Deakin University, Melbourne, Australia

Abstract

Purpose – The purpose of this paper is to construct an econometric model of the determinants of private investment with a particular focus on the impact of democracy on investment.

Design/methodology/approach – The first step was to econometrically derive the long-run elasticities; then to modify the Fiji computable general equilibrium (CGE) model to incorporate the investment function. Also the econometrically derived long run elasticities in the CGE model were used.

Findings – It was found that democracy has a positive and statistically significant impact on private investment in Fiji. The paper's simulation of Fiji becoming a fully democratic country on investment and other macroeconomic fundamentals, based on a CGE model, reveals that real gross domestic product and real national welfare increase by around 0.01 and 0.05 per cent, respectively; government savings and revenue performance improves; there is a trade balance surplus; and both private consumption and disposable income increase by around 0.05 and 0.12 per cent, respectively.

Originality/value – This is the first study that uses a CGE model to examine the impact of democracy, via investment, on other macroeconomic fundaments. No other study is known to have modelled democracy in a CGE framework.

Keywords Fiji, Democracy, Investments, Economic equilibrium

Paper type Research paper

Introduction

It is now widely accepted, both theoretically and empirically that private investment contributes to growth (see, *inter alia,* Barro and Lee, 1994; Barro, 1995; Ben-David, 1998; Collier and Gunning, 1999). Over the last decade, however, Fiji's private investment has been mediocre – averaging a mere 3.5 per cent of real gross domestic product (GDP) per annum. For policy-makers in Fiji, this issue has become a conundrum and is a cause for much tension between expectations and achievements on the macroeconomic front, given that the government recognises that, to achieve its targeted economic growth rate of 5 per cent per annum, private investment of 25 per cent of GDP is needed (Kubuabola, 2002, p. 18).

The author thanks Peter Dixon, Philip Adams, Mark Horridge, James Gilleskie and Jill Pearson for helpful comments and suggestions in modifying the Fiji CGE model.

International Journal of Social Economics
Vol. 35 No. 12, 2008
pp. 1017-1031

0306-8293
DOI 10.1108/03068290810911525

Some empirically studies (see, for instance, Narayan and Smyth, 2004; Seruvatu and Jayaraman, 2001) have found that coups in Fiji have had a statistically significant negative effect on private investment. In this paper, I aim to provide new empirical evidence and add further credence to the role of democracy in stimulating private investment and growth in Fiji. To achieve the aims of this paper, I first construct a suite of time series econometric models to establish the determinants of private investment in Fiji. I estimate five different long run models for the determinants of investment. The reason for this is twofold. First, theoretically, there are a large number of explanatory variables posited to determine investment. Given the small sample size (30 observations) in this study, it is impossible to model the impact of all variables in one model. Two, my main focus in this exercise is on the role of democracy on investment. Hence, by estimating five different models, keeping at least the democracy variable in all models, allow me to gauge the robustness of the democracy variable in explaining investment.

Having established the investment function, I then modify the Fiji computable general equilibrium (CGE) model (Narayan, 2003). More specifically, I incorporate the investment function in the model with the aim of shocking democracy and hence deriving the macroeconomic impacts. In doing so, this paper differs from the extant literature in two novel aspects. First, for the first time I investigate the relationship between democracy and investment within a time series cointegration framework.

The extant literature – on the relationship between democracy and growth – is based on either time series analysis/cross sectional analysis (Fosu, 1991, 1992, 2001, 2002; Rivera-Baitz, 2002) or panel data analysis (Baum and Lake, 2003). The empirical results are mixed. Some studies (Kormendi and Meguire, 1985; Scully, 1988) have found statistically significant effects of democracy on growth while other studies (Helliwell, 1994; Barro, 1996) have statistically insignificant relationship between democracy and growth[1]. The fact that no consensus exists on the nexus between democracy and growth prompted a new direction of research, centred on establishing the indirect effects of democracy on growth. Tavares and Wacziarg (2001, p. 1341) explain this direction of research more forcefully as follows:

> [...] all previous studies focus on the direct effect of democracy on growth, conditional on other growth inhibiting factors. This procedure should be questioned: In theory, if a comprehensive institution such as democracy matters, it should matter indirectly through its effects on variables that in turn determine economic growth.

This direction of research is headed by Barro (1996) and Tavares and Wacziarg (2001) who analyse the impact of democracy on most important determinants of growth, such as human and physical capital accumulation. In this light, the exercise in this paper is crucial and for the first time unravels the nexus between democracy and investment within a time series cointegration framework.

Second, this is the first study that uses a CGE model to examine the impact of democracy, via investment, on other macroeconomic fundaments. To the best of my knowledge no study has modelled democracy in a CGE framework.

The balance of the paper is organised as follows. In the next section, I provide an overview of democracy in Fiji. In the following section, I present the econometric model and econometric methodology. In subsequent sections, I give a brief account of the Fiji CGE model, and discuss the simulation results. In the final section, I conclude with some policy implications.

An overview of democracy in Fiji

Democracy does not only entail free and fair elections. Democracy has two key components: a free and fair election is one; the other is the actions of government in post-election. In this light, in this paper I follow the definition of democracy as put by Rivera-Baitz and Rivera-Baitz (2002, pp. 135-6):

> Democracy [. . .] [extends to] whether a country has checks and balances on executive powers, constitutional processes and guarantees, freedom of the press and the absence of censorship, clear and effective judicial and legal structures, incumbent term limits, and transparency, openness and citizen input in policymaking.

The democracy variable contains the two Freedom House (2001) indicators – political rights and civil rights. Freedom House constructs their indexes with the assistance of local and international printed materials, field visits and other communications with informed observers. Following a checklist of various components of democracy, countries are assigned a value for political rights and civil rights between one (most free politically) and seven (least free). Given that they are strongly correlated, and in order to obtain a single indicator, both are combined to form the democracy index. I use the transformation suggested by Helliwell (1994):

$$\text{Democracy} = \frac{14 - (\text{Political rights} + \text{Civil Liberties})}{12}$$

From this construction, it follows that democracy ranges from 0 (basically no political or civil liberties) to 1 (complete set of political rights and civil liberties). The democracy index for Fiji is presented in Table I.

Fiji was granted independence from the UK 1970 under a constitution which provided stable government through free and fair elections until 1987. This ensured that Fiji was ranked a free country by Freedom House with a democracy index of 0.83. However, in 1987, Fiji experienced two the military coups which led to an end of democratic governance and imposed an undemocratic constitution in Fiji in 1990. The 1990 constitution came under heavy criticisms, for it contained many discriminatory provisions which, amongst others, included the proviso that people of Indian origin could not hold certain positions such as prime minister, president and many other senior positions such as the Commissioner of Police, the Commander of the Fiji Military forces and the Chief justice. This saw Fiji's democracy rankings plummet to 0.25 in 1987. Up until 1991, with political tensions abound, Fiji's democracy ranking was fairly low. With a depressed economy and international pressure to uphold the virtues of democracy Fiji finally formulated and embraced a new constitution in 1997, which is non-discriminatory in that it recognises the multi-ethnic society, provides for a multiparty government and is designed for consociational politics.

Over the 1992-1998 period, Fiji's democratic rankings (0.58) were an improvement over the 1987-1991 period. In 1999, when in fresh elections based on the 1997 constitution Fiji elected a democratic government and for the first time an ethnic Indian became the prime minister, Fiji was classified as a free country with a democracy index of 0.75. However, it took another coup to break Fiji's democratic path and as a consequence Fiji's democracy rating fell sharply to 0.41 and 2000.

Econometric model

The long-run multivariate model estimated to establish the impact of democracy on private investment is as follows:

Year	Index
1972	0.8333
1973	0.8333
1974	0.8333
1975	0.8333
1976	0.8333
1977	0.8333
1978	0.8333
1979	0.8333
1980	0.8333
1981	0.8333
1982	0.8333
1983	0.8333
1984	0.8333
1985	0.8333
1986	0.8333
1987	0.2500
1988	0.4167
1989	0.3333
1990	0.3333
1991	0.3333
1992	0.5833
1993	0.5833
1994	0.5833
1995	0.5833
1996	0.5833
1997	0.5833
1998	0.5833
1999	0.7500
2000	0.4167
2001	0.5833

Table I.
Democracy index for Fiji, 1972-2001

$$\text{Model 1}: \ln \text{RPI}_t = \alpha_0 + \alpha_1 \ln \text{GI}_t + \alpha_2 \ln Y_t + \alpha_3 \ln \text{DEMO}_t + \alpha_4 \text{IR}_t + \varepsilon_{1t} \quad (1)$$

$$\text{Model 2}: \ln \text{RPI}_t = \alpha_0 + \alpha_1 \ln \text{GI}_t + \alpha_2 \ln Y_t + \alpha_3 \ln \text{DEMO}_t + \alpha_4 \text{WR}_t + \varepsilon_{1t} \quad (2)$$

$$\text{Model 3}: \ln \text{RPI}_t = \alpha_0 + \alpha_1 \ln \text{GI}_t + \alpha_2 \ln Y_t + \alpha_3 \ln \text{DEMO}_t + \alpha_4 \text{REER}_t + \varepsilon_{1t} \quad (3)$$

$$\text{Model 4}: \ln \text{RPI}_t = \alpha_0 + \alpha_1 \ln \text{GI}_t + \alpha_2 \ln Y_t + \alpha_3 \ln \text{DEMO}_t + \alpha_4 \text{ED}_t + \varepsilon_{1t} \quad (4)$$

$$\text{Model 5}: \ln \text{RPI}_t = \alpha_0 + \alpha_1 \ln \text{GI}_t + \alpha_2 \ln Y_t + \alpha_3 \ln \text{DEMO}_t + \alpha_4 \text{TO}_t + \varepsilon_{1t} \quad (5)$$

Here, lnRPI is the natural log of the real private investment. lnGI is the natural log of real government investment. A priori, the sign of α_1 is indeterminate. If α_1 is positive then it implies that government investment crowds in private investment and if α_1 is negative then it suggests that government investment crowds out private investment. lnY is the real per capita income, used as a proxy for market size. In a survey of studies over a 30 year period, Chakrabarti (2001) found a highly positive and statistically significant relationship between market size and real private investment. Hence, I expect that market size will positive impact private investment in Fiji. lnDEMO is the democracy index, as explained earlier. Most studies tend to measure the impact of political instability. In the case of

Fiji, Seruvatu and Jayaraman (2001) used a dummy variable to capture the impact of coups and found it to be negatively impacting investment. With respect to Equations (1)-(5), a priori, I expect that as Fiji becomes more democratic investment will increase.

lnIR is the natural log of the real interest rate. Consistent with the neo-classical theory, which states that higher interest rates raise the user cost of capital, I expect investment to be negatively related with real interest rate.

lnWR is the natural log of the wage competitiveness variable calculated wages adjusted by labour productivity. The wage index is calculated based on daily mean wages in the agriculture, mining, manufacturing, electricity, construction, commerce, transport and service sectors while labour productivity is calculated based on total employment and real GDP data. Following Wezel (2003), labour productivity is calculated by dividing the number of wage and salary earners by real GDP. A priori, the impact of the wage competitiveness variable on investment is indeterminate. For instance, to the extent that increases in wage rates are based on productivity improvements, rising wages rates will lead to an increase in investment. To this end, Hubert and Pain (1999) argue that wage rates, in addition to including deviations from average productivity levels, include difference in labour quality[2]. Moreover, Wheeler and Mody (1992) and Wei (2000) find a positive relationship between wages and investment for developing countries.

lnREER is the natural log of the real effective exchange rate. The empirical literature has found mixed results on the relationship between REER and investment. For instance, Goldberg and Klein (1997) find that a depreciation of the real exchange rate of large Asian countries to the yen attracted foreign direct investment from Japan. Yet Ghura and Goodwin (2000) caution that impact of real depreciation is uncertain, for imported inflation raises the prices of investment goods, which negatively impacts investment. It follows that a priori the relationship between investment and REER is ambiguous.

lnED is the natural log of the external debt. Wezel (2003) argues that despite external debt being an important indicator of a country's solvency it is less commonly used as a determinant of investment. Ghura and Goodwin (2000) contend that a rising external debt ratio is a clue of future tax liabilities which, given that it will deplete investor profits, is likely to have a negative impact on investment. This is consistent with tenet of corporate finance theory which posits that a relatively higher degree of risky debt may deplete a country's ability to accumulate growth through new investment (Meyers, 1977). Hence, a priori I expect a negative relationship between investment and external debt.

lnTO is the natural log of the trade openness variable measured as import plus export share of GDP. This measure constitutes trade flows and is expected to positively impact investment (Wezel, 2003; Noorbakhsh *et al.*, 2001; Hausmann and Fernandez-Arias, 2001).

Finally, the ϵ terms are serially independent random errors with mean zero and finite covariance matrix. Equations (1)-(5) are used to test whether the variables in respective models are co-integrated; if it is then this allows one to derive the long-run elasticities.

Our sample size in this study is dictated by data availability. While data on most variables is available from 1960, the democracy data is only available from 1972. The democracy data were extracted from Freedom House (Gastil *et al.*, 1972-2001). All other data is from the Reserve Bank of Fiji Quarterly Reviews and the Current Economic Statistics published by the Fiji Bureau of Statistics.

Econometric methodology

I employ the bounds testing procedure recently developed by Pesaran and Shin (1999), Pesaran *et al.* (1996), Pesaran and Pesaran (1997) and Pesaran *et al.* (2001), within an autoregressive distributed lag framework (ARDL). This procedure has several advantages over alternatives such as the Engle and Granger (1987) two-step residual-based procedure for testing the null of no cointegration and the system-based reduced rank regression approach pioneered by Johansen (1988, 1995) and Johansen and Juselius (1990).

The first main advantage, as highlighted in the introduction, is that the bounds test approach is applicable irrespective of whether the underlying regressors are purely $I(0)$, purely $I(1)$ or mutually co-integrated. Thus, because the bounds test does not depend on pre-testing the order of integration of the variables, it eliminates the uncertainty associated with pre-testing the order of integration. Pre-testing is particularly problematic in the unit-root-cointegration literature where the power of unit root tests are typically low, and there is a switch in the distribution function of the test statistics as one or more roots of the x_t process approach unity (Pesaran and Pesaran, 1997, p. 184). Second, the UECM is likely to have better statistical properties than the two-step Engle-Granger method because, unlike the Engle-Granger method the UECM does not push the short-run dynamics into the residual terms (Pattichis, 1999; Banerjee *et al.*, 1993, 1998).

The other major advantage of the bounds test approach is that it can be applied to studies that have a small sample size. It is well known that the Engle and Granger (1987) and Johansen (1988, 1995) methods of cointegration are not reliable for small sample sizes, such as that in the present study. Several previous studies, however, have applied the bounds test to relatively small sample sizes (see, *inter alia,* Pattichis, 1999; Tang, 2002; Tang and Nair, 2002; Narayan, 2004; Narayan and Narayan, 2004; Narayan and Smyth, 2003a, b, Narayan and Smyth, 2004).

Given that the bounds testing procedure to cointegration is a recent development in the econometric time-series literature, we here present a brief outline of this procedure. To implement the bounds test let us define a vector of two variables, $\mathbf{z}_t$, where $\mathbf{z}_t = (y_t, x_t')'$, y_t is the dependent variable and $\mathbf{x}_t$ is a vector of regressors. The data generating process of z_t is a p-order vector autoregression. For cointegration analysis it is essential that Δy_t be modelled as a conditional error correction model (ECM):

$$\Delta y_t = \beta_0 + \pi_{yy} y_{t-1} + \pi_{yx.x} x_{t-1} + \sum_{i=1}^{p} \vartheta_i \Delta y_{t-i} + \sum_{j=0}^{q} \phi_j' \Delta x_{t-j} + \theta w_t + \mu_t \qquad (6)$$

Here, π_{yy} and π_{yx} are long-run multipliers. β_0 is the drift and $\mathbf{w}_t$ is a vector of exogenous components, e.g. dummy variables. Lagged values of Δy_t and current and lagged values of Δx_t are used to model the short-run dynamic structure. The bounds testing procedure for the absence of any level relationship between y_t and $\mathbf{x}_t$ is through exclusion of the lagged levels variables y_{t-1} and x_{t-1} in Equation (6). It follows, then, that our test for the absence of a conditional level relationship between y_t and $\mathbf{x}_t$ entails the following null and alternative hypotheses:

$$H_0 : \pi_{yy} = 0, \quad \pi_{yx.x} = 0', \qquad (7)$$

$$H_1 : \pi_{yy} \neq 0, \quad \pi_{yx.x} \neq 0' \text{ or } \pi_{yy} \neq 0, \quad \text{or } \pi_{yx.x} = 0', \quad \pi_{yy} = 0, \quad \pi_{yx.x} \neq 0'. \qquad (8)$$

These hypotheses can be examined using the standard Wald or F statistics. We use the F-test which has a non-standard distribution which depends upon:

- whether variables included in the ARDL model are $I(0)$ or $I(1)$;
- the number of regressors; and
- whether the ARDL model contains an intercept and/or a trend. Critical values (CVs) for small sample sizes are reported in Narayan (2005).

If the computed F statistics fall outside the critical bounds, a conclusive decision can be made regarding cointegration without knowing the order of integration of the regressors. For instance, if the empirical analysis shows that the estimated F statistic is higher than the upper bound of the CVs then the null hypothesis of no cointegration is rejected.

Once cointegration is ascertained, the second stage involves estimating the long-run and short-run coefficients of the cointegrated equation. The mathematical derivation of the long-run and short-run parameters can be found in Pesaran *et al.* (2001).

Econometric results

I start by testing for the presence of long-run relationships. The bounds test for cointegration involves the comparison of the F-statistics against the CVs, which are generated using stochastic simulations for $T = 30$ based on 40,000 replications, as explained earlier. The calculated F-statistic when the real private investment is the dependent variable for all the five models is higher than the upper bound critical value of 4.223 at the 5 per cent level. The F-statistics for the remaining Equations (when other variables in the model are taken as dependent variables) are below the lower bound critical value of 4.097 at the 5 per cent significance level. This suggests that the null hypothesis of no cointegration cannot be accepted and that there exists a unique cointegration relationship between real private investment and its determinants in all the five models.

Having found a long-run cointegration relationship, Equations (1)–(5) are estimated using an ARDL model. For instance, for Equation (1) the following ARDL model is used:

$$\ln \mathrm{RPI}_t = \alpha_0 + \sum_{i=1}^{n} \alpha_1 \ln \mathrm{RPI}_{t-i} + \sum_{i=0}^{p} \alpha_2 \ln Y_{t-i} + \sum_{i=0}^{q} \alpha_3 \ln \mathrm{GI}_{t-i} + \sum_{i=0}^{r} \alpha_4 \ln \mathrm{DEMO}_{t-1} + \sum_{i=0}^{s} \alpha_5 \ln \mathrm{IR}_{t-1} + \mu_t \quad (9)$$

For Equation (10) a maximum of 2 lags was used, such that $i_{\max} = 2$. The estimated model presented here is based on the Schwarz Bayesian Criterion. Similarly, long-run equations for models (2)-(5) were constructed. The long-run estimates are reported in Table II. Broadly, my results are consistent with a previous study (Seruvatu and Jayaraman, 2001) on the determinants of private investment in Fiji. They found that, apart from the terms of trade variable and a coup dummy, all other variables (public investment, real lending rate, real private sector credit, real effective exchange rate, real GDP growth and real unit labour costs) were statistically insignificant. However, my result on the real unit labour cost is contrary to the findings of Seruvatu and Jayaraman (2001). I find it to be statistically significant and positively related to private investment, reflecting the fact that

Regressors	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	1.0668 (0.2350)	−4.8151 (−0.4785)	0.6188 (0.3952)	3.8466 (0.4451)	3.2375 (0.2486)
$\ln GI_t$	−0.2351 (−0.2144)	−0.2489 (−0.3909)	1.3753 (1.5457)	−0.7352 (−0.8163)	0.0394 (0.0431)
$\ln Y_t$	0.2901 (0.1310)	0.7166 (0.5046)	1.0091 (0.5155)	0.6475 (0.3987)	0.7164 (0.2929)
$\ln DEM_t$	1.0243** (2.1760)	0.6472** (2.3231)	1.4482* (2.0110)	1.0063** (2.8783)	1.1131** (2.3357)
$\ln IR_t$	0.5802 (0.7534)	–	–	–	–
$\ln WR_t$	–	1.2410* (2.1435)	–	–	–
$\ln REER_t$	–	–	−3.2278 (−1.4325)	–	–
$\ln ED_t$	–	–		0.3209 (1.7177)	–
$\ln TO_t$	–	–		–	−0.8353 (0.2486)

Table II.
Long-run elasticities

Notes: *, ** denote statistical significance at the 5 and 1 per cent levels, respectively

productivity based wage increases stimulate investment – a finding consistent with those of Wheeler and Mody (1992) and Wei (2000).

However, my main result here is regarding the impact of democracy on private investment in Fiji. Across all specifications, I find that democracy positively impacts private investment. This result is statistically significant at either the 5 per cent level or the 1 per cent level.

Fiji CGE model

The Fiji CGE model developed by Levatis (1999) and extended by Narayan (2003) is based on the ORANI model of the Australian Economy. A complete description, including the theoretical structure of the ORANI model, is provided in Dixon *et al.* (1982). The Fiji model, like the ORANI model, can be described as an economy-wide, comparative static CGE model of the Johansen class (Johansen, 1960). The Fiji CGE model consists of $m = 35$ domestic industries, $n = 34$ commodities and $q = 2$ occupational types. In total, 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 (Emperor gold mine and Mt. Kasi gold mine) because of the different cost structures of the industries. Further, the non-farm informal sector is grouped as a separate industry.

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 for domestic goods. A full list of the 35 industries and 34 commodities is given in Table III.

Model closure

The closure of a model entails decisions regarding the choice of exogenous and endogenous variables. This stems from the fact that in a model like the Fiji CGE 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

Source: Levatis (1999)

Table III.
List of industries and commodities in the Fiji model

the number of variables exceeds the number of equations. The number of endogenous variables must equal the number of equations. The remaining variables must be declared exogenous.

As mentioned earlier, in this paper my concern is with the long-run impact of democracy on Fiji's economy. 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, it allows 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 then, 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 the rate of return on capital also implies that, if changes in economic conditions induce growth in some industries, they will attract investment expenditure and *de facto* 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. I hold employment fixed. In the traditional wage-labour setting, the supply curve for labour for each industry and occupation is *de facto* horizontal. This implies that shifts in the demand for labour will be equilibrated with appropriate adjustments in the wage rate.

Model solution

Schematically, the Fiji model takes the following form:

$$F[\mathrm{Z}_1(t), \mathrm{Z}_2(t), \mathrm{Z}(0)] = 0 \tag{10}$$

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. The equations of the model, described earlier are derived from neoclassical microeconomic assumptions about the behaviour of price taking economic agents. The model is solved using the GEMPACK software package, developed by the Centre of Policy Studies and the Impact Project, Monash University. GEMPACK is a flexible model for solving CGE models (Codsi and Pearson, 1988). GEMPACK automates the process of translating the model specification into a model solution program. One needs to only create a text file, the syntax of which resembles ordinary algebraic notation, listing the equations of the model. The GEMPACK program TABLO then translates this text file into a model specific FORTRAN program, which, when executed, solves the model (Horridge *et al.*, 1993, p. 71).

Simulation scenario

In this section, I establish the link between econometrics and CGE modelling. In examining the macroeconomic impact of democracy for Fiji I use the econometrically estimated elasticities in the CGE model. I simulate a situation whereby Fiji becomes a fully democratic country.

Simulation results

In this section, I simulate the long-run impact of a situation whereby Fiji becomes a fully democratic country. I look at the impact of fully democracy for Fiji on some selected macroeconomic variables. The results are presented in Table IV. I find that as Fiji becomes fully democratic (scale of 1) real GDP increases by 0.01 per cent. Moreover, increasing economic activity due to a boost in investment leads to a 0.23 per cent increase in total exports. Total imports only increase by 0.02 per cent, leading to a balance of trade surplus. Government's revenue from tax, from being more democratic, increases by around 0.13 per cent. Improved revenue performance contributes to a rise in government savings by some 2.21 per cent. Increased economic activity also positively impacts private disposable incomes; it increases by 0.12 per cent. The increase in private disposable incomes is due to a rise in the wage rates; for instance, the rural and urban wage rates for unskilled labour

Variables	Per cent change
Total government savings	2.2095
Imports	0.0188
Exports	0.2254
Consumer price index	0.6579
Private disposable income	0.1157
Government revenue	0.1315
Real GDP	0.0119
Real consumption	0.0508
Real national welfare	0.0499

Source: Simulations based on the Fiji CGE model (Narayan, 2003)

Table IV. Macroeconomic effects for Fiji from a 10 per cent improvement in democracy

increase by 0.27 and 2.49 per cent, respectively. With an increase in disposable incomes, real consumption increases by 0.05 per cent. Finally, with a rise in GDP, an improvement of the real national welfare[1] of around 0.05 per cent is also recorded.

Conclusions and policy implications

The nexus between democracy and economic growth has been widely studied. Empirical studies, however, have failed to reach a consensus on this relationship. Some studies have found democracy having a positive effect; some have found it to be negatively related to economic growth, while others have found no statistically significant relationship between democracy and growth. This has prompted a new direction of research that examines the indirect effects of democracy on growth. In this study, I extend the analysis by examining the relationship between democracy and private investment – seen as one of the important determinants of growth – within a cointegration framework for Fiji. I find that democracy positively impacts investment. I then extend the analysis further by incorporating the investment function (econometrically estimated) into the CGE model. The aim here was to trace the impact of shocks to democracy not only on investment but also on other macroeconomic fundamentals – CGE models are the most superior technique in this regard. The long-run macroeconomic impact of Fiji becoming a fully democratic country is as follows:

- real GDP will increase by 0.01 per cent;
- real national welfare will increase by 0.05 per cent;
- exports will increase by 0.23 per cent while imports will increase by 0.02 per cent;
- private disposable income and consumption will increase by 0.12 and 0.05 per cent, respectively; and
- government revenue and government savings will increase by 0.13 and 2.21 per cent, respectively.

From these results, it is clear that democracy is important for the growth and development of Fiji's economy. Democracy in Fiji has been a function of coups. The fact that coups are man made means that they can be avoided. National conflicts should be solved using the constitution as a guide rather than overthrowing a democratically elected government.

Notes

1. For a recent survey, Brunetti (1997).
2. The fact that labour costs tend to include labour quality was taken as a justification for not including an educational attainment variable by Lehmann (1999). Moreover, Mody *et al.* (1999) found that Japanese foreign direct investment in Asia was significantly contingent on the quality of labour rather than on cheap labour.
3. In the Fiji CGE model, real national welfare is defined as including GDP, net private receipts of investment income from abroad, net private unrequited transfers from abroad and net foreign aid.

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Corresponding author

Paresh Kumar Narayan can be contacted at: narayan@deakin.edu.au