INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN ACCOUNTING, FINANCE AND MANAGEMENT SCIENCES

www.hrmars.com
ISSN: 2225-8329

The Influence of Oil Prices on an Oil-Importing Developing Economy

Fakhraddin Maroofi, Parviz Kafchehi

To Link this Article: http://dx.doi.org/10.6007/IJARAFMS/v2-i4/9997 DOI:10.6007/IJARAFMS /v2-i4/9997

Received: *10* October *2012*, ***Revised:*** *11* November 2012, ***Accepted:*** *29* November 2012

Published Online: 26 December 2012

In-Text Citation: (Maroofi & Kafchehi, 2012)

To Cite this Article: Maroofi, F., & Kafchehi, P. (2012). The Influence of Oil Prices on an Oil-Importing Developing Economy. *International Journal of Academic Research in Accounting Finance and Management Sciences*, *2*(4), 345–363.

Vol. 2, No. 4, 2012, Pg. 345 - 363

http://hrmars.com/index.php/pages/detail/IJARAFMS	JOURNAL HOMEPAGE

INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN ACCOUNTING, FINANCE AND MANAGEMENT SCIENCES
www.hrmars.com
ISSN: 2225-8329

The Influence of Oil Prices on an Oil-Importing Developing Economy

Fakhraddin Maroofi
Department of Management University of Kurdistan Kurdistan, Iran
Email: f_maroofi@yahoo.com

Parviz Kafchehi
University of Kurdistan Kurdistan, Iran
Email: p.kafcheh.ac.ir

Abstract
This research examines the influence of an increase in the price of oil on a developing economy. We consider the area to which the influences of oil price revelation depend upon the economy's internal production structure and its approach to the world financial market, and find that the long-run influence depends more on the earlier than the latter. Two unfavorable quantities which the long-run effects are (i) the relative share of oil to labor in production and (ii) the elasticity of replacement in production. We increase the unapproachable examination with numbers pretends, thereby allowing us to distinguish the short-run actives. In general, the affections can replicate much of the empirical evidence used to distinguish the effects of the recent oil price increases on the economy. They also focus the responsiveness of the effect of the oil price to the elasticity of replacement.
Keywords: Oil Price, Actives, Developing Economy

Introduction

Over the six year-periods, the inflation-adjusted price of unrefined oil almost be com four times bigger, peaking at nearly $ 150/barrel. With the rapid development of the BRIC (Brazil, Russia, India, and China) economies, most economists expect higher oil prices to be an indefinite and that they will continue to rise over the long term. In OECD (2004) finds that in non-OECD countries oil strengths have increased slightly up to the mid-1990s, before falling slightly. This literature focuses entirely on industrialized countries and does not consider developing economies. Nor does it address the long run growth problem with which this paper is affected. Backus and Crucini (2000) are argued that the differences in the terms of trade in a subset of OECD countries, and demonstrating how these can be largely credit to oil supply revelation.

The increase of oil prices during the past several years and the alarm that they will continue to rise are reason for effect. There is evidence regarding the negative relationship between increases of oil price and economic depressions. Dhawan and Jeske (2006) stated that since 1973, every depression has been introduced by a rise in energy prices, and that almost every energy price rise has been followed by a depression (Hamilton, 1983, 2003). Therefore energy plays in modern economies, its important rule to understand the channels through which oil price revelation influence of economic performance and personal well-being. This research examines the effect of oil price increases on the longer-run growth and production performance of a small oil-importing developing economy. This is important, since less developed economies have been more oil-dependent than are the more developed economies, and as a result more badly affected by oil price increases, particularly in the long run. This research suggests that the effects of the recent oil price revelation on real economic activity have been much peaceable than were those of the 1970s and 1980s, against the fact that the earlier oil revelation were of almost comparable relative magnitudes (Blanchard and Gali, 2000).

Most of this evidence is for developed economies and in some cases production growth has been affected at all (Nordhaus, 2007, Blanchard and Gali, 2004). As a result, we find that a constant oil price increase is likely to have different results for such an economy than for a developed economy. By focusing more on the macroeconomic effects of oil price revelation on larger, developed economies, the influence of oil revelation on the external sector has been not emphasize enough relative to its effect on internal productive activity. This is important in the case of small, trade-dependent, developing economies, where the two sectors are likely to be highly interdependent. Rebucci and Spataforta (2006) find that oil price revelation prefers to reduce benefit prices — including equities and exchange rates — and have a clear effect on a country's net foreign benefit (NFA) position. Kilian et al. (2009) finding shows balanced effects of oil price revelation on a country's net foreign benefit position. In particular, the effects of oil price revelation on a country’s external benefit position have important results for its internal productive capacities, its consumption possibilities, and its well-being. To what area do these positions depend upon the country's rang of oil dependence, its production structure, and the area of its financial integration in the world economy?

Therefore we have to develop a neoclassical growth model of an oil-importing developing economy, in which production depends upon labor, resources, as well as imported oil. The macroeconomic balance we described by an active system require the interaction between: *(i) the allocation of labor, (ii) the relative price of resources, (iii) the collection of resources, and (iv) the collection of foreign dues*. While the complexity of the model requires its unsettled actives to be examined using numbers of pretends, we are able to provide a complete systematic distinguishes of the long run reactions to an indefinite oil shock. In particular, they suggest how the long-run effects of an oil price increase on a small developing economy are determined by its internal production conditions. In the long run, its availability to the world financial is unimportant, though it does play a more significant role in the short run and during the transformation.

The collection of these short-run effects means that availability to the world financial market does have results for inter-temporal well-being. One key productive attribute is the relative share of oil consumption costs in GDP. Oil shares in production differ across economies. Gupta (2008) stated that in 2004 the lowest value of oil imports in GDP is in Australia with 0.44% and the highest in the Philippines with 5.18%, whereas in Europe it is on average 2.78% which is generally believable. In the elasticity’s of oil in production, we find that both the short-run and constant-state effects on production are quite small (OECD, 2004; Dhawan and Jeske, 2006; Nordhaus, 2007). Since developing countries prefer to have higher oil shares, [OECD, 2004; World Economic Outlook 2008], as well as in light of the observed changes in the oil share over time, (Nakov and Pescatori, 2009; Dhawan and

Jeske, 2006). These pretend confirm the empirical findings that lower oil shares average the unfavorable effects of oil price revelation. The other key production attribute is the elasticity of replacement. According to the elasticity of replacement in the productive inputs — labor, resources, and oil are the three factors of production replacement, the less unfavorable is the influence of an oil price shock on the economy. These effects are highly suggestions to small differences in the elasticity of replacement. The model can also replicate some of the unsettled active behavior of the financial variables studied by Rebucci and Spataforta (2006). Therefore, our suggestions analysis with regard to financial integration disclose that the more a country is combined into the world financial market, the stronger are the effects of an oil price rise.

Systematic Framework

In this research we present a standard sector of neoclassical model of an open economy that imports foreign good, oil, used only as a transitional input in domestic production. The economy is small and produces a dealing good, *Y*, that can be consumed, invested, or exported. The relative price of oil for dealing production, *p*, is determined in the world market. We suggest that *p* remains constant over time and examine the active effects of a onetime unanticipated indefinite increase in *p* and the each individual *i* is financed with one unit of time, and l_i, can be allocated to free time, and the reminder, $L_i \equiv 1-l_i$, to engagement. The population, *N*, grows at the given constant rate $\dot{N}/N=n$. Each individual produces dealing production, Y_i, using resources, K_i, labor, L_i, and imported oil, X_i, according to the neoclassical production function

$$Y_i = F(K_i; L_i; X_i) \quad (1)$$

Where each factor has positive, but decreasing, marginal product

$[F_i > 0,\ F_{ii} < 0,\ i=K, L, X]$. In addition to constant returns to scale, we suggest that the cross derivatives $F_{ij} > 0,\ i, j=K, L, X, i\neq j$, suggesting that all three factors are “cooperative” in production. The representative agent consumes dealing good at the rate, C_i, and enjoys free time, l_i, deriving utility over an infinite horizon represented by the isoelastic utility function

$$U_i \equiv \int_0^{\infty} \frac{1}{\gamma}\left[C_i l_i^{\theta}\right]^{\gamma} e^{-\beta t} dt, -\infty < \gamma < 1, \beta > 0 \quad (2)$$

The agent also collects resources, K_i, with expenditure on a given change in the resources stock, I_i, require to modify costs specified by the quadratic cost function

$$\Phi(I_i, K_i) = I_i + h\frac{I_i^2}{2K_i} = I_i\left(1 + \frac{hI_i}{2K_i}\right) \quad (3)$$

Where to modify costs are comparable to the rate of investment per unit of placed resources, I_i/K_i. Letting δ represent the rate of depreciation, and *n* is the population growth rate, the agent's net rate of resources collection is thus

$$\dot{K}_i = I_i - (n+\delta)K_i \quad (4)$$

We suggest that the world resources market evaluates the economy's ability to service its dues costs, and views the country's dues–resources ratio as an index of its possible default risk. Accordingly, the interest rate a country is charged on the world resources market increases with this ratio. This is summarized by an upward sloping supply plan for dues, which we identify by assuming that the leasing rate, *r*, charged on national foreign dues, *B,* increases with the ratio, *B/qK*, where *q* represents the market price of equity,

$$r \equiv r\left(\frac{B}{qK}\right) = r^* + \omega\left(\frac{B}{qK}\right); \omega > 0 \quad (5)$$

Where r^* is the given riskless world interest rate and *ω(B/qK)* is the country-specific leasing installment that increases with the nation's dues–resources ratio. Therefore the interest rate facing the debtor nation is an increasing function of the economy's total dues, which the individual agent rationally suggests that he cannot influence. Given this approach to the world goods and financial market, the domestic agent's budget restriction is specified by

$$\dot{B}_i = \left[r\left(\frac{B}{qK}\right) - n\right]B_i + C_i + pX_i + \Phi(I_i, K_i) - F(K_i, L_i, X_i) \quad (6)$$

Since we are effected with a developing country facing some limited approach to the world financial market, that focus on a debtor economy, which corresponds *to* $B_i > 0$ *(or* $B > 0$*).* But in fact whether the country turns out to be a debtor or creditor is depending upon whether $(\beta+n) > (<) r^*$, and the latter case corresponds to $Bi < 0$. The agent chooses consumption, labor free time, oil imports, investment, and the rates of resources and dues collection, to maximize utility *(2),* subject to the resources collection balance of (4) and his budget restriction (6). This produces the following conditions with regard to the individual's choices of C_i, l_i, X_i, and I_i

$$C_i^{\gamma-1} l_i^{\theta\gamma} = \lambda_i \quad (7)$$

$$\theta C_i^{\gamma} l_i^{\theta\gamma-1} = \lambda_i F_L(K_i, L_i, X_i) \quad (8)$$

$$F_x(K_i, L_i, X_i) = p \quad (9)$$

$$1 + h\frac{I_i}{K_i} = q \quad (10)$$

Where λ_i is the value of wealth in the form of internationally dealing relationships, and *q* is the value of resources in terms of the price of foreign relationships. *Balance of (7*) identifies the marginal utility of consumption to the marginal utility of wealth, while balance of (8) identifies the marginal utility of free time to the value of its opportunity cost, the real wage (the marginal product of labor). Balance of (9) identifies the marginal product of oil to its market price, *p,* whereas *balance of (10)* identifies the marginal cost of an additional unit of resources to the market price of resources. The demand for oil, given labor and resources, can be derived from balance of *(9)* and shown as

$$X_i = X_i(K_i, L_i, p) \qquad X_{i,K} > 0, \qquad X_{i,L} > 0, \qquad X_{i,p} < 0 \quad (11)$$

An increase in the relative price of oil reduces its demand, while the mutual “cooperation” among factors in production suggests that the consumption of oil increases with both resources and labor. Therefore, we can write Balance of (11) comparable in terms of resources and free time.

$$X_i = \varphi(K_i, l_i) \quad (12)$$

Dividing balance of (8) by balance of (7) gives the standard condition identifying the marginal rate of replacement between free time and consumption to the real wage. This can be shown as

$$\frac{\theta C_i}{l_i} = F_L(K_i, L_i, X_i) \quad (13)$$

Which we can show in the form

$$C_i = \frac{l_i}{\theta} F_L(K_i, 1 - l_i, \varphi(K_i, l_i)) \equiv \psi(K_i, l_i) \quad (14)$$

Producing maximum results with regard to B_i and K_i identifying the rates of return on consumption and investment in resources to the costs of leasing abroad,

$$\beta - \frac{\dot{\lambda}_i}{\lambda_i} = r\left(\frac{B}{qK}\right) - n \quad (15)$$

Vol. 2, No. 4, 2012, E-ISSN: 2225-8329 © 2012 HRMARS

$$\frac{F_K(K_i, L_i, X_i)}{q} + \frac{\dot{q}}{q} + \frac{(q-1)^2}{2\boldsymbol{h}q} - \delta = r\left(\frac{B}{qK}\right) \qquad (16)$$

The return to domestic resources consists of four elements: (1) "dividend" (2) resources gain, (3) additional benefit of a higher resources stock (4) loss due to the depreciating resources stock. Finally, in order to ensure that the agent's inter-temporal budget restriction is met, the following transversality conditions must hold:

$$\lim_{t\to\infty} \lambda_i B_i e^{-\beta t} = \lim_{t\to\infty} q\lambda_i K_i e^{-\beta t} \qquad (17).$$

Macroeconomic Balance

In balance of all static and active conditions, balances of (7) – (10) and balances of (15) – (17), must hold for all agents. Moreover, in constant-state balance of total quantities grow at the constant rate *n,* whereas the market price of resources, *q*, and the labor allocation, l_i, remain constant. Since all agents are the same, it is suitable to identify the actives in per-capita magnitudes, which are constant in constant-state balance, where we drop the subscript *i*. The actives can be shown as an independent system in the four variables, *K, B, q,* and *l*. This is accomplished as follows.

First, combining balances of (4) and (10), we may identify the per capita collection of physical resources in the form:

$$\frac{\dot{K}}{K} = \frac{q-\mathbf{1}}{\boldsymbol{h}} - \delta - n \qquad (18)$$

Next, replacement for *I, C* and *X* into the agent's flow restriction (balance of (6)), we may identify the per capita collection of dues as

$$\dot{B} = \left[r\left(\frac{B}{qK}\right) - nB\right] + \psi(K,l) + p\varphi(k,l) + \left(\frac{q^{\mathbf{2}}-\mathbf{1}}{2\boldsymbol{h}}\right)K - F\big(K, 1-l, \psi(K,l)\big) \qquad (19)$$

Third, we show the finance condition (16) in the form

$$\frac{\dot{q}}{q} = r\left(\frac{B}{qK}\right) + \delta - \frac{(q-\mathbf{1})^{\mathbf{2}}}{2\boldsymbol{h}q} - \frac{F_K\big(K, 1-l, \varphi(K,l)\big)}{q} \qquad (20)$$

Finally, we show the active to modify for free time as follows. First, taking the time derivative of the balance condition *(7)* and combining with balance of (15), produces

$$(\gamma - \mathbf{1})\frac{\dot{C}}{C} + \theta\gamma\frac{\dot{l}}{l} = \beta + n - r\left(\frac{B}{qK}\right) \qquad (21)$$

Next, taking the time derivative balance of (14) we achieve

$$\frac{\dot{\boldsymbol{C}}}{\boldsymbol{C}} = \frac{\boldsymbol{\psi}_{\boldsymbol{K}}(\boldsymbol{K},\boldsymbol{l})\boldsymbol{K}}{\boldsymbol{\psi}(\boldsymbol{K},\boldsymbol{l})}\left(\frac{\dot{\boldsymbol{K}}}{\boldsymbol{K}}\right) + \frac{\boldsymbol{\psi}_{\boldsymbol{l}}(\boldsymbol{K},\boldsymbol{l})\boldsymbol{l}}{\boldsymbol{\psi}(\boldsymbol{K},\boldsymbol{l})}\left(\frac{\dot{\boldsymbol{l}}}{\boldsymbol{l}}\right) \qquad (22)$$

Solving balances of (21) and (22) and combining with balance of (18), we may identify the actives of free time in the form

$$\frac{\dot{l}}{l} = \frac{\left[r\left(\frac{B}{qK}\right) - (\beta+n)\right] - (1-\gamma)\frac{\psi_K(K,l)K}{\psi(K,l)}\left[\frac{q-\mathbf{1}}{\boldsymbol{h}} - (\delta+n)\right]}{(1-\gamma)\frac{\psi_l(K,l)l}{\psi(K,l)} - \gamma\theta} \qquad (23)$$

Balances of (18)–(20) and (23) complete the report of the balance actives. Clearly it describes a relatively high order nonlinear system, the formal analysis of which is completely intractable. When K=Ḃ=q=l=λ =0, and is determined by the following set of balance equations:

$$\frac{\mathbf{q-1}}{h} = n + \delta \tag{24}$$

$$\tilde{r} = r\left(\frac{\tilde{B}}{\tilde{q}\tilde{K}}\right) = \beta + n \tag{25}$$

$$\tilde{l} + \tilde{L} = \mathbf{1} \tag{26}$$

$$\tilde{Y} = F(\tilde{K}, \tilde{L}, \tilde{X}) \tag{27}$$

$$\frac{\theta\tilde{C}}{\tilde{l}} = F_L(\tilde{K}, \tilde{L}, \tilde{X}) \tag{28}$$

$$F_x(\tilde{K}, \tilde{L}, \tilde{X}) = p \tag{29}$$

$$\frac{F_K(\tilde{K}, \tilde{L}, \tilde{X})}{\tilde{q}} + \frac{(\tilde{q}^2 - 1)^2}{2\boldsymbol{h}\tilde{q}} - \delta = \beta + n \tag{30}$$

$$\beta\tilde{B} + \tilde{C} + p\tilde{X} + \left(\frac{\tilde{q}^2 - 1}{2\boldsymbol{h}\tilde{q}}\right)\tilde{K} = F(\tilde{K}, \tilde{L}, \tilde{X}) \tag{31}$$

Balances of *(24), (25), (30), and (31)* are related to balances of (*18)–(20), (23); (28),* (27), and (29) restate balances of (13), (1), and (9) separately; while balance of (26) restates the agent's time allocation restriction. These eight balances of equations determine the constant-state values of the eight variables, $\tilde{K}$, $\tilde{L}$, $\tilde{l}$, X, $\tilde{Y}$, $\tilde{B}$, $\tilde{q}$, and $\tilde{C}$. Because of the (i) the long-run market price of placed resources, $\tilde{q}$, (ii) the common growth rate of total variables, (iii) the long-run leasing rate, and (iv) the constant-state dues–balance of equity ratio, $B/q\tilde{K}$, are all independent of the price of oil, p. From the constant-state balance of equations we can show that if the economy is having net positive wealth, so that $qK > B$, the constant-state free time must satisfy the restriction

$$\tilde{l} > \frac{\theta}{1+\theta} \tag{32}$$

Table 1 shows the long-run effects of an increase in the price of oil where production is created by the Constant Elasticity of Replacement (CER) production function used to examine the unsettled actives

$$Y = A[\alpha_1 L^{-\rho} + \alpha_2 X^{-\rho} + \alpha_3 K^{-\rho}]^{-1/\rho} \tag{33}$$

$$\alpha_1 + \alpha_2 + \alpha_3 = 1, and -1 \leq \rho < \infty$$

The elasticity of replacement is showed by $\sigma 1/(1+\rho)$, while α_2 parameterizes the rang of oil dependence. For this purpose various forms of the CER production function have been engaged. Since (i) these increase the number of parameters significantly, and (ii) the variation of the empirical evidence distinguishing the exchangeability–complementarity relationship, making the proper structure unclear, we feel that balance of (33) serves as a guideline (Backus and Crucini 2000). With the long-run balance marginal product of resource being independent of *p* [balance of *(30)]* and the balance marginal product of oil increasing with p [balance of *(29)],* the decreasing marginal productivity of resources suggests that the ratio of oil to labor, *X/L,* declines. Given the cooperation between resources and oil in production, the ratio *K/L* declines as well. The reaction of the labor–free time allocation is subject to two reducing effects. First, the reduction in both the relative consumption of oil and resources reduces the real wage, inducing agents to take more free time. But the need to allocate more resources to oil requires a reduction in consumption, which reduces the marginal utility of free time, encouraging agents to work more. Which effect controls depends upon the elasticity of replacement.

Table 1. Long-run effects of increase in oil price

$\frac{d\tilde{L}/\tilde{L}}{dp/p}$	$[\theta-(1+\theta)\tilde{l}]\frac{\tilde{S}_x}{S_L}(1-\sigma)$
$\frac{d\tilde{Y}/\tilde{Y}}{dp/p}=\frac{d\tilde{K}/\tilde{K}}{dp/p}=\frac{d\tilde{B}/\tilde{B}}{dp/p}$	$[(1+\theta)(1-\tilde{l})(1-\sigma)-1]\frac{\tilde{S}_x}{S_L}<0$
$\frac{d\tilde{X}/\tilde{X}}{dp/p}$	$\frac{dK/\tilde{K}}{dp/p}-\frac{\theta(1-\tilde{l})(1-\sigma)}{\tilde{l}}\frac{\tilde{S}_x}{S_L}-\sigma<0$
$\frac{d\tilde{C}/\tilde{C}}{dp/p}$	$((d\tilde{K})/\tilde{K})/(dp/p)-\theta(1-\tilde{l})(1-\sigma)/\tilde{l}\ \tilde{S}_x/S_L = -[1+((1-\tilde{l}))/\tilde{l}[\theta$

(i) The condition θ<(1+θ)l̃ is equivalent to qK̃>B, i.e. the country has positive net wealth.

(ii) s_X, s_L indicate the shares of oil and labor, respectively, in GDP.

Table 1 show that the elasticity describing the long-run reaction of labor. With the long-run ratio of relationships to resources independent of the oil price, an increase in *p* reduces the resources stock, and in general wealth, in the same portions. Moreover, Row *2* of Table 1 suggests that the increase in the oil price reduces long-run production by the same comparable amount as well. The decline in oil consumption in *Row 3* suggests that the resources–oil ratio increases by σ, while consumption declines relatively more (less) than does resources, according to whether *σ< (>) 1*. In the case of the Cobb–Douglas production function *(σ=1)* the long-run effects of an oil price increase are very simple. First the two effects noted above on engagement are exactly reducing, leaving engagement unchanged. Resources, production, dues, and consumption all decline at the same comparable rate given by the ratio of the elasticity of oil dependence to that of labor in the production function. In general, Table 1 suggest that the key factor concluding the long-run influence of an oil price increase on a developing economy are its internal production conditions, rather than its approach to external financial markets. Therefore, for the Cobb–Douglas technology the relative shares of oil to labor, which is fixed, is the only applicable determinant. As the production function separates from the Cobb–Douglas, the relative shares, remain important as does the elasticity of replacement itself. The country's approach to the international financial markets which is applicable for the Cobb–Douglas technology, suggests some secondary role in so far as it influences the long-run factor shares and the labor–free time allocation.

Numbers Pretends

To examine the actives, we suggest that production is produced by the CER production function defined in *balance of* (33) ; and consider the related linear estimated to the balance active system, *balances of (18)–(20) and (23),* require four variables, *K, q, and l*. Therefore there must be two unsteady roots to match the two "jump" variables *q and l*. For all reasonable sets of parameter values our simulations produce this required pattern of the values (Table 2).

Table 2. The benchmark economy

Preference parameters	$\gamma=-1.3, \beta=0.03, \theta=1.67$
Production parameters	$\alpha_1=0.2, \alpha_2=0.01, \alpha_3=0.34$ $\alpha_1=0.5, \alpha_2=0.05, \alpha_3=0.32$ $\sigma=0.70$, 1, 1.20, A=1, h=11, $\delta=0.04$
World interest rate	R*=0.042, r*=0.058
Borrowing premium	$\eta=0.01$, 0.1, 1[a]
Population growth rate	n=0.012
Price of oil	p doubles from 1 to 2

[a] The functional specification of the upward-sloping supply curve of debt that we use is $r(b)=r^*+e^{\eta b}-1$. Thus, in the case of a perfect world resource market, when $\eta=0$, we obtain $r(b)=r^*$, the world interest rate.

Our choices of preference parameters, β and γ, related to a rate of time preference of 3% and an inter-temporal elasticity of replacement of 0.4, separately, are standard. The elasticity of free time, $\vartheta=1.67$, is traditional in the real business cycle literature, and plays a critical role in ensuring a labor allocation in the reasonable range ($l\approx0.6$). The elasticity of labor $\alpha_1=0.5$ in production is also noncontroversial, as is the rate of depreciation, $\delta=0.04$, and the population growth rate of 1.4%, while A ranking the primary productivity. The world interest rate is set at 4.2%. The choice of installation costs is less clear. Our focus on a developing economy introduces three fault-finding. The First, parameter, η, shows the suggestions of the leasing installment to the country's dues position, and thus distinguishes its rang of approach to the world financial market. Empirical evidence in most of the studies mixed and achieves a significant positive and convex relationship (Min, 1998; Zoli, 2004).

Second, we distinguish the rang of flexibility in production in terms of the elasticity of replacement, allowing it to differ between 0.70 and 1.20 (Duffy and Papageorgiou, 2000), who found that for the poorest developing countries the elasticity of replacement is less than unity (around 0.7). On this basis, and given its important role in macro actives, in modern growth theory, it seems reasonable to take the Cobb–Douglas specification as a guideline and to vary the elasticity between 0.70 and 1.20, thereby spanning reasonable values. Third, we consider the degree of oil dependence of the economy, with the related productive elasticity's $\alpha_2=0.02$, 0.05 distinguishing a relatively low oil-dependent and a relatively high oil-dependent economy, separately. While on average developing countries are more oil-dependent than are OECD countries (OECD, 2004, and World Economic Outlook, 2008), there is considerable variation across such economies. Since these empirical studies embed this effect in larger structural empirical relationships, it is hard to relate the influence of the dues–production ratio to the value of η (Chung, Turnovsky, 2010). However, we can note that our guideline value of $\eta=0.1$ suggests that each percentage point increase in dues raises the country leasing installment by something over 1 basis point. This is of the same order of magnitude as implied by the empirical studies of Edwards (1984) and Chung and Turnovsky (2010) and Zoli (2004). But, we allow η to differ between $\eta=0.01$, and $\eta=1$, providing a good estimated to prevention from the international fellowship market. The value of η is the critical determinant of the balance dues–production ratio and support for the guideline value $\eta=0.1$ is that it produces a reasonable balance dues–production ratio of around 35% (depending upon oil consumption).

Table 3. Initial balance [parameter values: $r^*=0.042$, $A=1$, $\alpha_1=0.5$, $\gamma=-1.5$, $n=0.012$, $h=11$, $\beta=0.04$, $\theta=1.67$, $\delta=0.04$, $p0=1$]

	Oil dependence α2=0.01								Oil dependence α2=0.05							
	Y_0	I_0	K_0/Y_0	X_0/Y_0	B_0/Y_0	C_0/Y_0	W_0	μ_1, μ_2	Y_0	I_0	K_0/Y_0	X_0/Y_0	B_0/Y_0	C_0/Y_0	W_0	μ_1, μ_2
σ=0.67																
η=0.01	0.432	0.626	1.887	0.0522	3.353	0.632	-353.16	-0.0769 - 0.0138	0.345	0.625	1.734	0.1202	3.085	0.587	-545.02	-0.0786 - 0.0148
η=0.1	0.384	0.663	1.887	0.0522	0.324	0.750	-275.11	-0.1518 - 0.0432	0.309	0.655	1.736	0.1202	0.301	0.701	-424.61	-0.1514 - 0.0422
η=1	0.376	0.668	0.888	0.0512	0.031	0.765	-266.28	-0.4944 - 0.476	0.306	0.669	1.735	0.1202	0.021	0.710	-412.69	-0.4933 - 0.0476
σ=1																
η=0.01	0.537	0.627	2.343	0.0200	4.156	0.601	-281.45	-0.0642 - 0.0109	0.406	0.624	2.104	0.0600	3.715	0.601	-423.21	-0.0663 - 0.0121
η=0.1	**0.463**	**0.677**	**2.341**	**0.0200**	**0.407**	**0.742**	**-210.42**	**-0.1415 - 0.0322**	**0.356**	**0.665**	**2.104**	**0.0600**	**0.364**	**0.721**	**-316.37**	**-0.1447 - 0.0344**
η=1	0.455	0.686	2.342	0.0200	0.032	0.754	-202.10	-0.4721 - 0.0354	0.351	0.675	2.101	0.0600	0.017	0.735	-312.55	-0.4812 - 0.0378
σ=1.15																

η=0.01	0.720	0.624	2.903	0.0071	5.137	0.513	-231.27	-0.0514 -0.0068	0.502	0.627	2.515	0.0285	4.479	0.552	-349.23	-0.0554
η=0.1	0.585	0.701	2.903	0.0071	0.506	0.702	-143.05	-0.1327 -0.0223	0.419	0.685	2.522	0.0286	0.439	0.713	-241.20	-0.1366 -0.0258
η=1	0.576	0.701	2.903	0.070	0.042	0.711	-132.39	-0.4502 -0.0246	0.414	0.678	2.523	0.0283	0.036	0.721	-234.33	-0.4633 -0.0284

Bold indicate the most reasonable scenario

Table 3 shows the primary balance of related to the guideline parameter values and for different values of *η and σ*. Of these different values we identify the values η=0.1, σ=1 (set in bold) as the most reasonable guideline. Therefore, the weight of oil in GDP is 0.01 or 0.05, depending upon the dependence as parameterized by α_2. In general, the balance is a reasonable distinguishes of a developing economy having limited approach to the world financial market. Toward the right hand side of each panel, we have calculated the related level of the well-being integral *(2),* when the economy is in the related constant-state. In general, normalizing the primary population to $N_0=1$, well-being is:

$$W = \frac{1}{\gamma}\int_0^{\infty} C(t)^{\gamma}\, l(t)^{\theta\gamma} e^{-\beta t} dt \qquad (34)$$

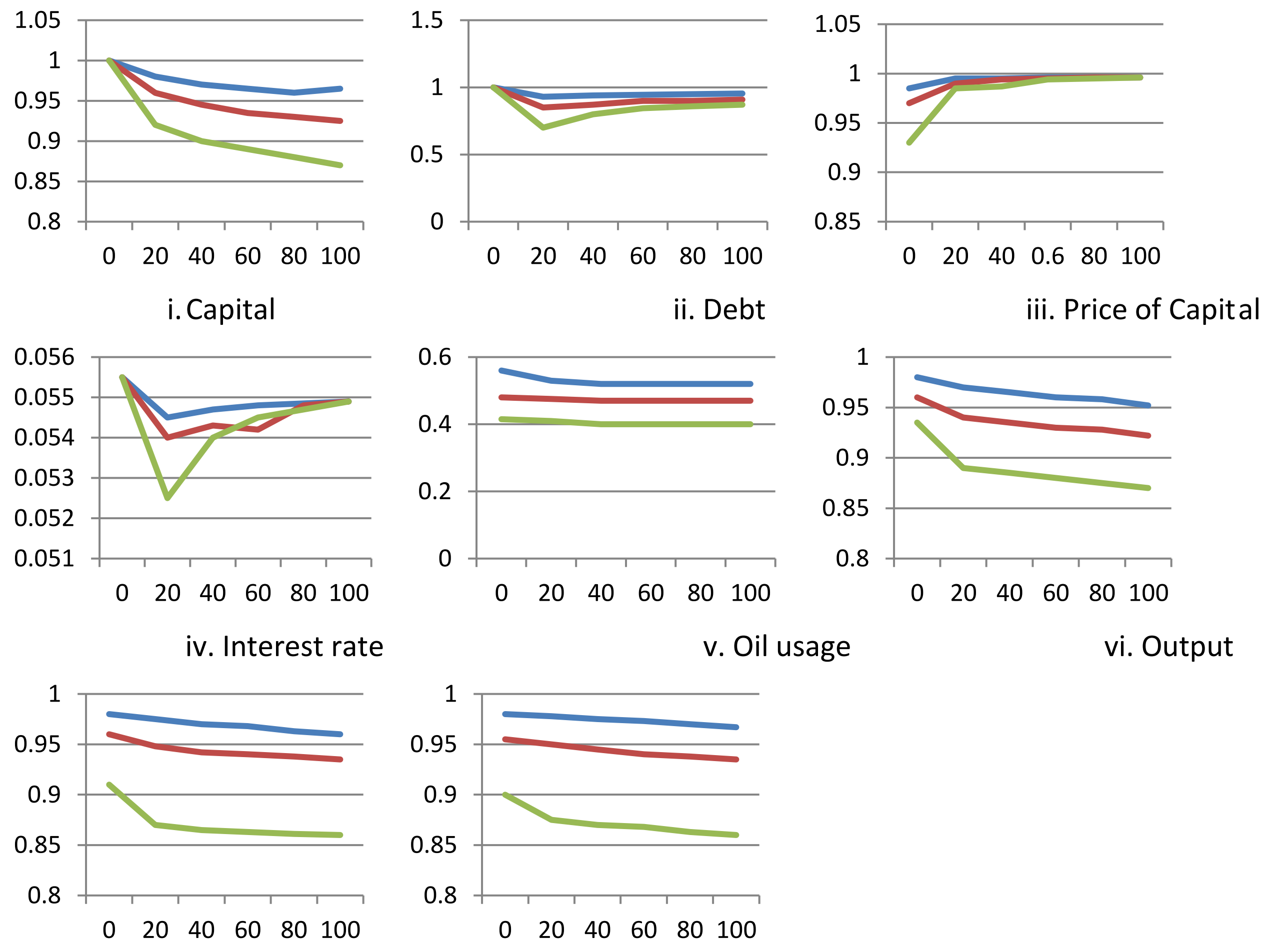
Which in constant-state balance simplifies to

$$W = \frac{1}{\gamma}\frac{\tilde{C}^{\gamma}\, \tilde{l}^{\theta\gamma}}{\beta} \qquad (35)$$

later changes in well-being resulting from increases in the oil price are achieved by identifying the change in the well-being measure in terms of the comparable differences in the flow of income necessary to identify the primary levels of well-being to what they would be following the oil price increase, (both long run and short run). The three panels of Table 3 produce some interesting features of the constant-state balance. First, more flexibility in production suggests more resources and production, more free time, more consumption, less oil consumption and more dues. Second, the balance resources–production and oil–production ratios remain unchanged, suggesting that the production–engagement ratio remains unchanged as well. The increase in free time, and related decrease in engagement, suggests a reduction in production. Thus, with more consumption and free time as well as less dues to service, the country is better off by having its approach to the world resources market enclose. Third, greater oil dependence, α_2, suggests a larger share of GDP chargeable to oil consumption. Oil consumption is exactly balanced to oil dependence, α_2, if the production function is Cobb–Douglas, more than balanced if $\sigma<1$, and less than balanced if $\sigma>1$. An increase in oil dependence lowers the resources– production ratio. The country's position in the international fellowship market declines in that a dues or country reduces its dues. The constant-state work–free time allocation is hardly suggestions to the dependence on oil so that the reduction in the use of resources leads to a decline in production. The greater consumption of imported oil means that consumption in the more oil dependent economy is lower, although whether it is relatively lower than production depends upon the elasticity of replacement in production. As η increases and the economy's approach to the world financial market declines, the country reduces its dues. This allows it to enjoy more consumption and more free time. Finally, the fact that the values increase with the leasing installment, (larger η), and production inflexibility (smaller σ), suggests that less developed countries will adjust faster to structural changes, coherent with the empirical results of Ibrahim and Hurst (1990) for oil revelation.

Active to Modify to an Increase in the Price of Oil

Figs. 1 and 2 support the active to modifying of key variables in reaction to a doubling of the oil price from p=1 to 2. Fig. 1 supports the suggestions of the reactions to differences in the elasticity of replacement in production, σ, while Fig. 2 compares the reactions as the country's availability to the international financial market, η, varies.



i. Capital ii. Debt iii. Price of Capital

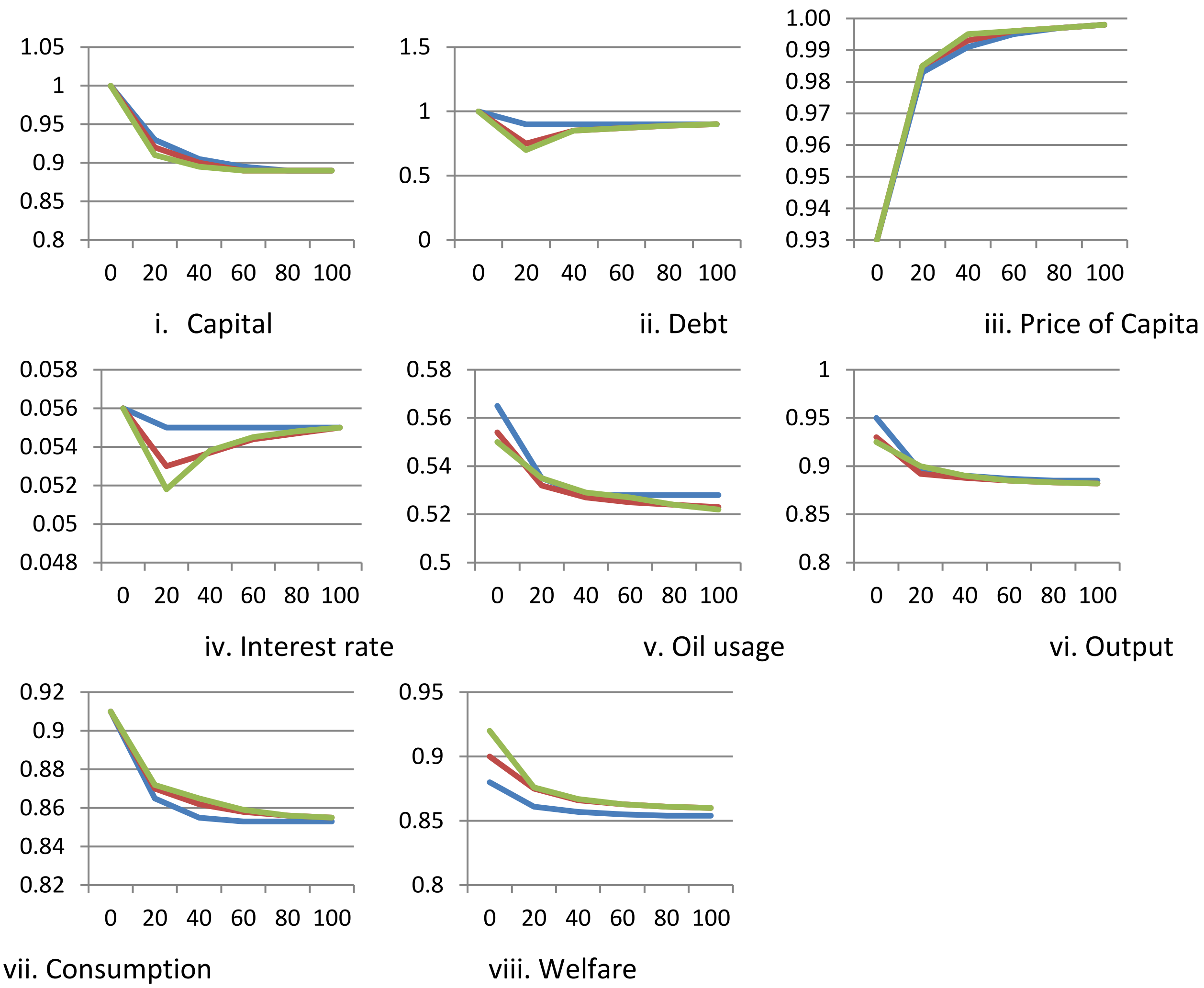
iv. Interest rate v. Oil usage vi. Output

vii. Consumption viii. Welfare

Vol. 2, No. 4, 2012, E-ISSN: 2225-8329 © 2012 HRMARS

$\sigma = 1$ ……………………… $\sigma = 0.65$ ……………………… $\sigma = 1.15$

Figure 1. Sensitivity of response to oil price increase to elasticity of substitution



$\eta = 0.1$ ……………………… $\eta = 0.01$ ……………………… $\eta = 1$

Figure 2. Sensitivity of response to oil price increase to access to world financial market

Table 4. Changes in output and welfare [parameter values: r=0.045, A=1, α1=0.6, γ=−1.5, n=0.015, h=12, β=0.04, θ=1.75, δ=0.05, p0=1, p=2].

Oil dependence α2=0.01					Oil dependence α2=0.05			
	ΔY(0)%	ΔW(0)%	ΔỸ%	ΔW̃ %	ΔY(0)%	ΔW(0)%	ΔỸ%	ΔW̃%
σ=0.70								
η=0.01	-2.306	-5.004	-4.632	-5.713	-5.463	12.064	-11.101	-13.568
η=0.1	-2.878	-4.101	-4.801	-5.118	-6.976	-9.910	-11.457	-12.176
η=1	-3.100	-3.959	-4812	-5.013	-7.465	-9.555	-11.500	-11.959
σ=1								
η=0.01	-1.047	-1.923	-2.276	-2.112	-3.322	-5.785	-6.686	-6.262
η=0.1	**-1.307**	**-1.488**	**-2.275**	**-1.841**	**-4.061**	**-4.581**	**-6.690**	**-5.543**
η=1	-1.386	-1.405	-2.277	-1.807	-4.300	-4.328	-6.67	-5.455
σ=1.15								
η=0.01	-0.445	-0.779	-1.121	-0.833	-1.860	-2.905	-4.101	-3.065
η=0.1	-0.555	-0.543	-1.085	-0.63	-2.271	-2.168	-3.965	-2.643
η=1	-0.586	-0.502	-1.073	-0.676	-2.341	-2.012	-3.957	-2.605

Bold indicates the most reasonable scenario

Table 4 shows the short-run and long-run changes in production and well-being following the price increase, as both *σ* and *η* differ. The short-run change measures the influence effect that happens when the higher oil price hits the economy. The long-run production change describes the constant-state reaction [Table 1], while the long-run well-being change measures the gathered change in well- being, as measured by the inter-temporal utility function, balances as the economy cross its unsettled path. Although our focus has been restricted to the case of a debtor oil importing country, it is useful to compare the reactions of a creditor country to an oil price increase. First, the long-run reactions are almost the same for both debtor and creditor economies, reflecting the fact that the long-run reactions are essentially independent of the economy's approach to the world financial market, and hence it's net benefit position (line 2 of table 1). Differences during the transformation are more significant. For example, the creditor economy will suffer a slightly larger short-run production reduction. This is because, having more resources, it enjoys higher balance free time, and lower engagement.

While the influence effect of the higher oil price on both economies is roughly balance, it leads to a larger comparable reduction in engagement in the creditor economy, causing a larger reduction in its primary production. But this in turn means a larger increase in free time, so that against its greater reduction in primary production, well-being in the creditor economy is less badly affected. The fact that it remains (slightly) below its balance during the transformation forces, additional well-being loss on the creditor economy, so that the accumulated inter-temporal well-being losses of the creditor nation ends up being almost the same as that of the debtor.

The other difference is that the effects of a higher oil price on both the short-run and inter-temporal well-being of a creditor country are fewer suggestions to its approach to the world financial market than they are for a debtor nation. This is because, for a creditor economy, as η increases, the smaller reduction in consumption which happens is counterbalance by a larger increase in free time, leaving a small net effect on well-being; for a debtor economy these two effects are mutually strengthen. Figure 2 supports the responsiveness of the reaction to the availability to the world financial market. Since for the Cobb–Douglas production function the long-run reactions are independent of the country's availability to the world financial market (Table 1), we consider the case where σ=0.65, which is also typical for poorer developing economies. We also sustain α2=0.01, and allow η to differ by a factor of 100 between 0.01 and 1. Setting σ=0.65, we still find that the long-run responsiveness to η remains modest (but not zero), so that most of the influence of market availability on the economy's reaction to the oil price shock happens during the early phases of the transformation. If the economy has easy approach to the world fellowship market (η=0.01), it contracts a large amount of dues with large dues service costs (Table 3).

While the increase in the oil price will reduce its demand, and therefore the need for additional dues, the considerable servicing of the existing dues will prevent dues from declining too fast, and this in turn will decrease the decline in the interest rate. In addition, the need to service the dues will force pressure on trying to sustain the production. With the resources stock fixed in the short run, the decline in oil consumption will require a quick increase in engagement, and indeed, we find that engagement increases on influence by 2%. The increase in engagement increases the productivity of oil and reduces the motivation to cut its consumption, which it does by 38% (Fig. 2(v)). With dues and the leasing rate declining slowly, the price of resources, q, rises slowly so that resources declines relatively quickly. As approach to the world financial market declines, these effects are averaged.

The need to increase engagement to finance the short-run service declines, and with it the productivity of oil, the use of which declines more rapidly in the short run. In addition, the confined approach to the world resources market leads to the reversal of dues and interest, supported in Figure 2(ii) and (iv), and discussed previously. One further point of interest is that the primary 2% increase in engagement that arises when η=0.01 has significant (negative) well-being effects. From Table 4 we see that as availability to the world financial market declines from η=0.01 to η=1 the decline in well-being due to a higher oil price declines from 12.7% to 11.0%. Figure 1, supported *η=0.1 and* α_3*=0.05*, therefore in this case more heavily oil-dependent economy; the case α_3*=0.01* is qualitatively similar, but more average. Except for the interest rate, the modifying is presented relative to their separate primary base levels, thus enabling us to see the relative reactions to the structural change. From these figures, one can identify several qualitative types of unsettled to modify paths. First, oil consumption, production, consumption, and instant well-being all complete the major part of their separate to modify with a primary drop on influence, although they decline during the later transformation.

Second, resources, restricted to adjust continuously, declines gradually. In contrast, dues, which also is restricted to continuous to modifying, somewhat reverses its time path during the transformation. Finally, the price of resources and the interest rate, which also undergo primary jumps on influence, both fully return to their separate pre-shock levels. Taking the Cobb–Douglas production function as a suitable guideline, the quick effect of doubling the oil price is to reduce its consumption dramatically by 50%. The effect on labor is not supported, and with the resources stock fixed sometime production straight away drops by 4.04%.

Therefore the decline in its consumption reduces the productivity of resources, the quick effect of which is to reduce its price, *q*, by around 2% on influence. The short-run decline in *q (t),* by reducing the value of resources, raises the leasing installment, albeit by a very small amount. This leads to a decline in investment, and in the long run the resources stock falls by around 6.4%. Figure 1 supports how, as σ decreases and the flexibility of the production technology is reduced, the ability of the economy to take in a higher oil price, with less unfavorable effects on domestic activity, declines. Indeed, the area to which this happens is suggestions to relatively modest changes in *σ*. In all these cases, in the long run oil strength, (X/Y), falls, suggesting that the empirically founded decline in oil strength is in fact a result of the reaction of firms to oil price increases (Alaimo and Lopez, 2008). These positions are reflected in the figures showed in Table 4. Such an economy will suffer a long-run production loss of between 10.6% (for σ=0.64) and 3% (for σ=1.15). In the short run, the doubling of the oil price will cause the economy to suffer a production loss of between 6.0% and 2.1%. For a slightly oil dependent economy (α_2=0.01) having average approach to the world financial market (η=0.1), these losses are basically similar, although considerably smaller. They decline almost comparably for the Cobb–Douglas to around 1%, and even more than comparably if σ=1.15. These numbers are coherent with the empirical problem discussed. They confirm the observation that the recent revelation having been less costly than those of the 1970s is a reflection of the decline in the importance of oil in production. They are also coherent with the idea that developing economies, which typically have less flexible production technologies, are more badly affected by world-wide oil revelation.

Moreover, our results supports a Bodenstein et al. (2007), which is found that the higher the elasticity of replacement, the higher the decline in oil consumption and the smaller the wealth effect. The reaction of oil consumption is less straightforward to reconcile. While the long-run price elasticity of oil consumption slightly in surplus of unity [Table 1, row 3] is reasonable, and coherent with empirical evidence (Pindyck and Rotemberg, 1983), the fact that most of the reaction happens on influence appears less so. However, these results apply to developed economies and Ibrahim and Hurst (1990) have shown that the time profile of the reaction of developing countries to oil price revelation is rather different. They find that while the replacement is more limited, the modifying happens rapidly, leaving little difference between the short-run and long-run reactions. Moreover, one can easily reduce the primary reaction in oil consumption and slow down its later to modify by introducing and to modify cost function for oil consumption (Bodenstein et al. 2007). A second reason, in addition to greater oil dependency, why the unfavorable effect of higher oil prices on a net oil-importing developing country are more serious than for OECD countries is because of their less efficient consumption(International Energy Agency 2004). We briefly address this issue by modifying the increased CER production function to

$$Y = A[\alpha_1 L^{-\rho} + \alpha_2 X^{-\rho} + \alpha_3 K^{-\rho}]^{-1/\rho} \qquad (36)$$

$$\alpha_1 + \alpha_2 + \alpha_3 = 1, and -1 \le \rho < \infty$$

Where *ε; 0≤ε≤ 1* parameterizes the range of oil efficiency consumption and *ε=1* represents the guideline case of completely efficient consumption. We have conducted large numbers pretends with regard to oil dependence and its efficient consumption. First, we may note that for the guideline Cobb–Douglas function (*ρ=0, σ=1),* differences in the range of oil efficiency have no effect on either production or well-being changes following an oil price increase. For *σ<1, (σ>1)* lowering the range of oil efficiency has qualitatively the same effects on the production- and well-being changes and on the time paths for economic key variables as increasing (decreasing) the range of oil dependency. As a specific example, consider a dues or country distinguished by the parameters *σ=0.65, η=0.1,* α_2*=0.01* (relatively low elasticity of replacement, transitional approach to the world financial market and low oil dependence). With efficient consumption a doubling of the oil price leads to short-run losses in production and well-being of 2.75% and 3.85%, separately, with the related long-run losses being 3.96% and 4.65% (Table 4). If *ε=0.5* (50% loss in efficiency) the short-run losses in production and well-being are increased to 2.35% and 3.99%, while the related long-run losses are 4.97% and 5.51% (Stefan et al,2011). These are roughly comparable to increasing the oil dependence parameter to

$\alpha 2=0.027$, with full oil efficiency, ε=1. Thus our simulations support the empirical observation that inefficiency in oil consumption is a significant issue for developing economies.

Conclusions

In this paper we have examined the influence of an increase in the price of an imported transitional input (oil) on the economic performance of a developing economy. The key feature of the economy is that it has limited approach to the world financial market, specified in terms of leasing costs that increase with its dues/ balance ratio, as an index of its dues surviving ability. The two critical quantities showing the long-run effects are (i) the share of oil to labor in production and (ii) the elasticity of replacement in production. In the case of the Cobb–Douglas production function, international financial market availability is applicable in concluding the long-run effects, although it is important in the short run. It is also important in concluding how rapidly the economy adjusts to structural changes, including an oil price increase. On bases of a neoclassical growth model, our analysis incorporates that the oil price has no long-run growth effects, although it does have indefinite level effects. Consideration has been focused on the area to which the influences of oil price revelation are suggestions to structural attributes such as the economy's internal production structure and its approach to the world financial market. In this regard we show that the long-run influence is much more dependent upon the earlier than on the latter. Our analysis has increased the formal theoretical analysis with numbers pretends, thereby enabling us to distinguish the short-run actives. Some elements of the modifying's to an oil price shock are completed relatively quickly, while other parts of the modifying's happen gradually. In general, our numbers pretends are able to replicate much of the empirical evidence used to distinguish the effects of the recent oil price increases on the economy. The numbers pretends we undertake highlights just how suggestions the effect of the oil price is to changes in the elasticity of replacement. Our analysis has treated the oil price as being exogenous. For the developing country we are envisioning this is reasonable. But in reality, oil prices are determined by OPEC as part of strategic negotiations with the developed economies. An interesting addition would be to model this procedure and to study its influence on the developing economies of the world (Stefan et. al, 2011).

Finally, we conclude with two particular things for consideration. First, is that has achieved consideration and we have not addressed effects possible a balanced reactions to oil price revelation (Mork, 1989, Hamilton, 1996). Reasons for the asymmetry include policy reactions and to modify costs related with changes in oil consumption (Atkeson and Kehoe, 1999, and Wei, 2003). While this nonlinearity is important if one deals with short-run oil price fluctuations where both price increases and decreases happen with regularity, it is less applicable for our analysis where our effect has been with studying a worldly, long-run change (increase) in the oil price, which is not returned. Moreover, the evidence of a balanced effect of oil price revelation for developing countries is less attention than it is for OECD countries (Dargay and Gately, 1995), who conduct such a comparison. And in fact, even for OECD countries the evidence in favor of asymmetries has recently been questioned (Kilian and Vigfusson, 2009). In any event, our framework can lodge a balanced to modify the positive and negative changes in oil prices by, for example, specifying to modify cost parameter, *h*, in investment that is much larger for economic enlargements (positive investment) than it is for contractions.

References

Alaimo, V., Lopez, H. (2008). Oil intensities and oil prices: Evidence for Latin America. Policy Research Working Paper 4640, The World Bank, Washington DC.

Atkeson, A., Kehoe, P. J. (1999). Models of energy use: putty-putty versus putty-clay. American Economic Review 89, 1028–1043.

Backus, D. K., Crucini, M. J. (2000). Oil prices and the terms of trade. Journal of International Economics 50, 185–213.

Bodenstein, M., Erceg, C. J., Guerrieri, L. (2007). Oil shocks and external adjustment. International Finance Discussion Papers Number 897.

Chung, K., Turnovsky, S.J., (2010). Foreign debt supply in an imperfect international capital market: Theory and evidence. Journal of International Money and Finance 29, 201–223.

Dargay, J., Gately, D. (1995). The response of world energy and oil demand to income growth and changes in oil prices. Annual Review of Energy and the Environment 20, 145–178.

Dhawan, R., Jeske, K. (2006). How resilient is the modern economy to energy price shocks? Economic Review. Federal Reserve Bank of Atlanta, pp. 21–32.

Duffy, J., Papageorgiou, C. (2000). A cross-country empirical investigation of the aggregate production function specification. Journal of Economic Growth 5, 87–120.

Edwards, S. (1984). LDC foreign borrowing and default risk: an empirical investigation, 1976–80. American Economic Review 74, 726–734.

Gupta, E. (2008). Oil vulnerability index of oil-importing countries. Energy Policy 36, 1195–1211.

Hamilton, J. D. (1983). Oil and the macroeconomy since World War II. Journal of Political Economy 91, 228–248.

Hamilton, J. D. (1996). This is what happened to the oil price-macro economy relationship. Journal of Monetary Economics 38, 215–220.

Hamilton, J.D., (2003). What is an oil shock? Journal of Econometrics 113, 363–398.

Ibrahim, I.B., Hurst, C., (1990). Estimating energy and oil demand functions: a study of thirteen developing countries. Energy Economics 12, 93–102.

International Energy Agency. (2004). Analysis of the influence of high oil prices on the global economy. Energy Prices and Taxes 2nd Quarter, pp. xi–xix.

Kilian, L., Vigfusson, R. J. (2009). Pitfalls in estimating abalanced effects of energy price shocks. http://www-personal.umich.edu/~lkilian/kv14apr09.pdf.

Kilian, L., Rebucci, A., Spatafora, N. (2009). Oil shocks and external balances. Journal of International Economics 77, 181–194.

Min, H. G. (1998). Determinants of Emerging Market Bond Spread: Do Economic Fundamentals Matter? World Bank Policy Research Paper No. 1899.

Mork, K. A. (1989). Oil and the macroeconomy when prices go up and down: an extension of Hamilton's results. Journal of Political Economy 97, 740–744.

Nordhaus, W. (2007). Who's afraid of a big bad oil shock? Brookings Papers on Economic Activity 2, 219–238.

OECD. (2004). Oil price developments: Drivers, economic consequences and policy responses. In: OECD Economic Outlook No. 76, ch. IV, 1–29.

Pindyck, R.S., Rotemberg, J.J., (1983). Dynamic factor demands and the effects of energy price shocks. American Economic Review 73, 1066–1079.

Rebucci, A., Spataforta, N., (2006). Oil prices and global imbalances. In: IMF World Economic Outlook, April 2006, ch. II, 71–96.

World Economic Outlook. (2008), IMF, October 2008, Ch. 3: Is Inflation Back? Commodity Prices and Inflation, IMF, Washington, DC.

World Energy Outlook. (2008), International Energy Agency, Paris.

Zoli, E. (2004). Credit rationing in emerging economies' access to global capital markets.
IMF Working Paper WP/04/70.