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Macroeconomic Effects of Terms-of-Trade Shocks

The Case of Oil-Exporting Countries

Nikola Spatafora
Andrew Warner

The experience of 18 oil-exporting countries (from 1973 to 1989) suggests that permanent terms-of-trade shocks have a significant positive effect on consumption, investment, and output, particularly of nontradables. There is almost no effect on savings, and an adverse effect on the trade balance. There is no evidence of Dutch disease effects.

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Summary findings

Spatafora and Warner investigate the impact on economic growth and development of long-run movements in the external terms of trade, with special reference to the experience of 18 oil-exporting countries between 1973 and 1989.

They argue that this sample approximates a controlled experiment for examining the impact of unanticipated — but permanent — shocks to the terms of trade. They analyze the sample econometrically using panel data techniques.

They find that permanent terms-of-trade shocks have a strongly significant positive effect on investment, which they justify theoretically on the grounds that countries in the sample import much of their capital equipment.

The shocks also have a significant positive effect on consumption. Government consumption responds almost twice as strongly as private consumption.

The shocks have no effect on savings and adversely affect the trade and current account balances.

There is a significant positive effect on the output of all main categories of nontradables. But Dutch disease effects are strikingly absent. Agriculture and manufacturing do not contract in reaction to an oil price increase. Dutch disease effects may be absent in part because of policy-induced output restraints in the oil sector, or because of the "enclave" nature of the oil sector, which does not participate in domestic factor markets.

This paper — a product of the International Economic Analysis and Prospects Division, International Economics Department — is one in a series of background papers prepared in support of the analyses and scenarios in *Global Economic Prospects 1994*. Copies of this paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Jackie Queen, room S8-216, extension 33740 (37 pages). January 1995.

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MACROECONOMIC EFFECTS OF TERMS-OF-TRADE SHOCKS: THE CASE OF OIL-EXPORTING COUNTRIES.

Nikola SPATAFORA & Andrew WARNER

I. Introduction

Most development economists agree that variations in world prices are an important source of risk and instability for developing economies. Developing countries derive about half their export earnings from primary commodities, whose world prices are extremely volatile. Nor is such volatility purely short-term: much data suggest that commodity prices undergo long periods of rise and decline. To provide one example of the magnitudes involved, the World Bank's index of non-oil commodity prices has exhibited a trend decline of about 1.5% per annum since 1948, cumulating to a 50% decline over 45 years. Over the next decade, the World Bank is forecasting that this trend will reverse and there will be a rise of about 0.7% per annum. What is the impact of these long-run movements in the external terms of trade on economic growth and development?

We think that the world has provided a natural experiment over the past 25 years that can be used to analyze this issue. Oil-exporting developing countries experienced a major rise in the world price of their main export between 1973 and 1981, followed by a smaller, but still substantial, decline between 1981 and 1989. Nominal oil prices rose from $2.70 in 1973 to $34.31 in 1981, and then fell back to $16.31 in 1989; deflating this by US producer prices, real oil prices rose from an index of 1.0 in 1973 to 5.83 in 1981 and 2.42 in 1989. From a research standpoint, we think that this episode represents a fortunate opportunity to better understand the impact of terms-of-trade shocks, for the following reasons.

First, it seems important to distinguish between permanent and transitory, or anticipated and unanticipated changes in the terms of trade, and we believe that oil prices come closer than any other data to measuring an unanticipated permanent change. The 1973 rise was not anticipated several years before, and it was quickly and widely perceived as a permanent feature of the economic landscape. The long decline

beginning in 1981 was also not widely anticipated; it probably took longer for it to be accepted as a long-run phenomenon, but at least by 1986, when oil prices fell by 25%, the 1981 levels were long considered a thing of the past. Hence, it is credible that the major long run changes in oil prices were previously unanticipated events that were widely viewed to be permanent once they occurred.

Second, the time span of the rise and decline in oil prices is fairly long—8 or 9 years—so that it is credible to believe that we can observe long-run effects. Third, the movements in oil prices were large. Hence, there is much statistical variation, and if effects are present, we should be able to estimate them more efficiently. Fourth, terms-of-trade changes were so dominant for these countries over this period that deciding what variables to control for, so as to avoid omitted variable bias, should constitute less of a problem.

Fifth, we have both a rise and a decline in oil prices, so that we can try to detect asymmetries in the responses. Sixth, measurement problems associated with index numbers are less of an issue for oil exporters, since oil is a relatively homogeneous product. Seventh, simultaneity between the terms of trade and domestic economic variables, while not always absent, is at least a tractable problem because there is a fair consensus about the causes of the major oil price movements. Further, for many of the countries and most of the variables we examine, it seems reasonable to view the terms of trade as predetermined.

Our broad conclusion is that an examination of the data for oil exporters leads to a different picture of terms-of-trade effects than can be obtained from an unbiased sample of terms-of-trade articles in the literature. We find that the impact on investment is crucial to understanding the response of the current account to, and the long-run growth effects of, terms-of-trade shocks; yet the literature is filled with current account models that hold investment constant, and long-run trade models that treat the capital stock as an endowment which is unaffected by terms-of-trade shocks. Conversely, Dutch disease effects are examined extensively in the literature, but we fail to find any evidence that the Dutch disease is a major phenomenon. We also find that the simple insights from the tradables-nontradables model are well supported by the data. Finally, we find that the response of expenditure to terms-of-trade shocks is not very sensitive to whether the expenditure comes from the public or private sector.

The rest of the paper is divided as follows. Section II summarizes the relevant theoretical literature and empirical studies. Section III contains a description of the data. Section IV sets out the econometric framework and analyses some important econometric issues. Section V presents the main results. Section VI discusses some criticisms. Section VII concludes.

II. Theoretical literature and empirical studies

For expository purposes, we find it useful to divide the theoretical literature on the impact of terms-of-trade shocks into two broad groups. One class of models is microeconomic in nature and stresses the differing effects of terms-of-trade shocks on different sectors of the economy. Examples include the tradables-nontradables models originated by Meade, Salter (1959), and Swan; the Dutch Disease models found in, say, Wijnbergen (1984, 1984b) and Neary & Wijnbergen (1984), and summarized in Corden & Neary (1982) and Corden (1984); and the computable general equilibrium model of Bruno & Sachs (1982).

A second class is concerned with the behavior of broad macroeconomic aggregates, particularly saving and the current account, and recently has tended to stress intertemporal issues. A partial reference list for this literature includes Laursen & Metzler (1950), Harberger (1950), Obstfeld (1982), Persson & Svensson (1985), and Bean (1986).

A. Sectoral Effects

Many of the insights from the earlier literature stressing sectoral disaggregation can be obtained, following Corden, by thinking in terms of a three-sector, perfectly competitive neoclassical model, with fixed total factor endowments. Let the first sector (O) produce oil for export; let the second, 'Dutch Disease' sector (D) produce all other tradables, both exportables and importables; and let the third sector (N) produce non-tradables. The first two sectors produce tradables at given world prices, and the difference between the quantity supplied and demanded is made up by exports or imports; the price of nontradables is endogenously determined by the condition that their supply equal their demand. Assume first that output in each sector is produced by a factor specific to that sector, and by labor, which is mobile between all three sectors and moves between sectors to equalize its wage in all three employments.

Now let there be an oil price shock. The direct effect is to increase the aggregate incomes of the factors initially employed in O, which in turn has two effects. First, if some part of the extra income is spent, whether directly by factor owners or indirectly through being collected in taxes and then spent by the government, and provided the income elasticity of demand for N is positive, demand for N rises. Given less than perfectly elastic supply, the price of N relative to tradables must rise. That is, there is a real appreciation which draws resources out of O and D into N. This is the *spending effect*. In addition, the price increase raises the marginal value product of factors in O so that, at a constant wage in terms of tradables, the demand for labor in O rises, inducing a movement of labor out of D and N. This is the *resource movement effect*. The output of D must finally be lower than before the shock, while the output of N could be higher or lower: the spending effect tends to increase it, the resource movement effect to decrease it.

Assume now, as is common, that the oil sector does not in fact employ any factors that can be used by the rest of the economy. Here, the oil sector is an 'enclave' which does not participate in domestic factor markets. There is then *only* a spending effect, and the key mechanism of resource reallocation is the real appreciation. Provided spending on nontradables initially goes up, output of N must finally be higher than in the pre-shock situation.

Assume instead that more than one factor is mobile between at least two of our three main sectors. For instance, say that capital is also mobile between D and N, so that these two sectors, employing labor and capital in different proportions, make up a mini-Heckscher-Ohlin economy. Now the resource movement effect can have paradoxical result. Because of the price shock, labor moves out of this mini-economy into O. If D is the capital-intensive industry, its output could on balance expand. If N is capital-intensive, the shock could cause a real depreciation.

At this stage it is useful to compare the predictions of this neoclassical model with a Keynesian model. In the neoclassical model, with factors fixed in the short run, and full employment determining output through the production functions, there is no scope for 'aggregate output' to change much: the shock can at most change the composition of output. However, in a Keynesian economy with sticky prices, the demand stimulus can raise aggregate output even in the short run.

Regarding longer-term supply-side effects, the neoclassical framework predicts that these hinge crucially on the relative price signals. Reproducible factors, such as physical and human capital, will accumulate in sectors whose relative prices rise following the terms-of-trade improvement (more precisely, the relevant price is a product price adjusted for movements in input prices, that is, a value added price). As we have seen, the relative prices in O and N typically rise in the short run, and thus factors accumulate in these sectors, expanding output in the longer run. By contrast, capital will shift out of, or be allowed to depreciate without replacement, in D.

B. Macroeconomic effects

Turning now to the macroeconomic literature, early analyses, conducted within the framework of the static Keynesian saving and investment functions, include Laursen & Metzler (1950) and Harberger (1950). The driving mechanism is that terms-of-trade shocks affect real income, and hence savings. Given investment, this determines the evolution of the current account. Later research, typified by Obstfeld (1982), Persson & Svensson (1985), and Sen & Turnovsky (1989), is based on neoclassical models, typically involving dynamic optimization. Terms-of-trade shocks alter permanent income, intratemporal and intertemporal relative prices, and hence affect consumption, saving, and investment. One conclusion to emerge from this literature is that the effects depend critically upon whether the shock is permanent or temporary, and anticipated or unanticipated.

Let us first consider the possible impact of a permanent, unanticipated increase in the terms of trade on consumption. The shock increases both current and permanent income. All models therefore predict an increase in aggregate consumption. In sectoral terms, consumption of oil is probably insignificant for our sample, and consumption of other tradables must rise through income effects. Consumption of nontradables must equal production, which was discussed above.

Investment is treated as exogenous by much of the literature. Older Keynesian models often postulate a simple accelerator mechanism whereby the shock raises expected demand and hence investment. Optimizing models usually conclude that aggregate private investment is determined by the ratio of Tobin's q (the present discounted value of future marginal products of capital) to the aggregate investment price deflator. Assuming that capital goods have a strong import content, the shock boosts domestic

investment–Schmidt-Hebbel & Serven (1993). Yet most models treat investment goods as domestically produced, and hence obtain far more ambiguous result–Persson & Svensson (1985), Sen & Turnovsky (1989). For developing economies, the former assumption appears to be correct.

Three factors may however reduce the incentive to invest. First, profits may be captured by unions (rent-sharing). Yet many of these countries lack an organized labor movement. Second, in OPEC countries production quotas may be seen as a permanent ceiling on oil production, leaving little reason to invest in the oil sector's productive capacity. On the other hand, an increase in such capacity might strengthen one's hand in the periodic quota negotiations; also, there is still an incentive for cost-reducing investment. Finally, increased wealth may encourage consumption of leisure, and a contraction in labor supply will reduce the marginal product of capital; see Bean (1986), Sen & Turnovsky (1989). Yet many of these countries face an extremely elastic supply of potential immigrant workers.

Regarding the current account, Laursen & Metzler postulated that the shock. by raising real income, increases savings. For a given investment, this increases the current account. In an optimizing intertemporal framework, with domestically produced investment goods, Obstfeld (1982) and Svensson & Razin (1983) showed that with a constant rate of time preference the economy should jump immediately to its new steady state, with no effect on the current account. If instead the rate of time preference decreases with utility, there is a transitory rise in savings and current account surplus. On the other hand, if investment requires imports of capital machinery, it may be encouraged by the shock, leading to a temporary current account deficit.

C. Empirical Studies

Warner (1992) examined whether the international debt crisis which began in 1982 could explain the investment decline in 14 heavily indebted countries. He found that equations which omitted all debt-related information, but incorporated the effects of falling export prices and high world real interest rates, could forecast the fall in investment. This suggests the importance of the terms of trade in determining investment.

Warner (1994) proposed and estimated a microeconomic investment model to determine the relative importance for Mexico's investment decline in the early 1980's of three explanations: the oil price decline,

the termination of capital inflows, and debt-overhang/uncertainty effects. Using quarterly investment data for 68 private-sector industries between 1981 and 1985, he found that the main microeconomic mechanism driving the investment decline was the rise in the relative price of imported investment goods, and further that the terms of trade decline (driven by falling world oil prices) explains much of the increase in this relative price.

Morley (1992) examined stabilization programs in a broad sample of LDC's. Using panel data, he found that the terms of trade had a significant positive impact on investment and output. The same was true of real appreciations, which as we have argued are a likely consequence of terms-of-trade shocks.

Etherington & Yainshet (1988), using time-series methodology, found that the price of coffee, the key Ethiopian export, had a significant positive impact on Ethiopian capital good imports and domestic capital formation.

De Gregorio (1992) analyzed growth determinants in twelve Latin American countries over the period 1950-1985. Controlling for investment and macroeconomic stability, he did not find a significant effect of the terms of trade on growth. However, he did not consider that investment itself might be affected by the terms of trade.

III. The Data

We consider the period 1965-1989. Our sample consists of the following 18 oil-exporting countries:

Algeria	Gabon	Mexico	Trinidad and Tobago
Bahrain	Indonesia	Nigeria	United Arab Emirates
Congo	Iran	Oman	Venezuela
Ecuador	Iraq	Saudi Arabia	
Egypt	Kuwait	Syria	

For each country, on the expenditure side we examined data on consumption and investment (by the private sector, by the government, and in the aggregate), savings, the trade balance, and GDP. At a sectoral level, we analyzed value added in the oil sector and the non-oil sector. The non-oil sector was further broken down into the following categories: agriculture, manufacturing, construction, public utilities, and

services. Services were in turn disaggregated into transportation & communications, wholesale & retail trade, and other services. Tradables are probably most appropriately identified with agriculture and manufacturing, nontradables with the other non-oil categories. All the above variables were in per capita, constant local currency terms. As explanatory variables, we used data on the terms of trade, a debt crisis dummy, and the world real interest rate. All variables were at an annual frequency. A full description of the data used and its sources is in Appendix 1.

IV. Econometric framework and issues.

A. Estimation

Throughout, we use a panel rather than a time-series methodology since, if the underlying assumptions are satisfied, this allows for more precise estimates and renders omitted variable bias a less serious problem (see next sub-section). We have no strong priors, and theory provides little guidance on the speed at which our variables adjust to terms-of-trade shocks. Therefore we take what we think is a flexible approach to the issue of dynamics. As a first pass, we try to pick out long-run relationships by selecting years when sufficient time has passed under a given regime for the countries to be in long-run equilibrium. Specifically, we note that 1973 was the end of a long period of stable oil prices; in 1981, after eight years of rising prices, agents generally accepted the higher prices as permanent, and had had some time to adjust to them; in 1989, after an eight-year period of falling prices, agents likewise accepted and had had some time to adjust to the lower prices; and, after 1989, oil prices rose sharply around the time of the Gulf War. Thus in 1973, 1981, and 1989 the countries in our sample could arguably have achieved long-run equilibrium. We therefore use these three benchmark years to carry out fixed-effects estimation of the following panel regression equation:

$$y_{it} = \alpha_i + \beta TOT_{it} + \epsilon_{it} \quad , \qquad (1)$$

where y denotes the natural log of each of the variables we study (except for the trade balance, which is left in levels), TOT denotes the log of the terms of trade, the i subscript refers to countries, and t refers to

time. The elasticity of each variable with respect to the terms of trade is given by β. The regression results are given in Appendix II, table 1.

In addition, we also use the full data set to carry out fixed-effects estimation of the following regression equation, which allows for lagged responses:

$$y_{it} = \alpha_i + \beta_1 TOT_{it} + \beta_2 TOT_{i,t-1} + \gamma\, CONTROL_{it} + \epsilon_{it} \quad , \qquad (2)$$

where CONTROL denotes the control variables, which potentially include the debt crisis dummy and the world real interest rate. Because there is little theoretical guidance available on when and whether we should include the debt crisis dummy, we excluded it where it was insignificant. The results for the world real interest rate were hard to interpret, and we always excluded it. The only exception were the investment equations where, given the strong theoretical priors, we always controlled for the debt crisis and for the world real interest rate. The short-run elasticity of each variable with respect to the terms of trade is given by β_1, the steady-state elasticity by $(\beta_1 + \beta_2)$. The regression results are given in Appendix II, table 2, and are discussed in the next section.

Note that our specification of equations (1) and (2) makes three important assumptions. First, the random errors ϵ_{it} have zero mean and are i.i.d. over time and across countries. Second, the intercept α varies across countries (but not over time), so that there are country-specific effects. I subject this hypothesis to the following Lagrange Multiplier test, due to Breusch & Pagan (1980). Let α be a random term with cross-country variance σ^2_α. Let the null hypothesis be that there are no country-specific effects, that is, H_0: $\sigma^2_\alpha = 0$, versus H_1: $\sigma^2_\alpha > 0$. Let $\hat{e}_{it}$ denote the residuals from the standard OLS regression with homogeneous intercepts. Under H_0, the test statistic

$$LM = \frac{N\,T}{2(T-1)} \left(\frac{\sum_i \left(\sum_t \hat{e}_{it} \right)^2}{\sum_i \sum_t \hat{e}_{it}^2} - 1 \right) \xrightarrow{d} \chi^2(1) \; .$$

The asymptotic P-values are reported in Appendix III. In all regressions, LM is significant at the .0001% level; we therefore reject the null. Note that, since the test statistic has a block-diagonal information matrix, this pre-test does not affect the standard errors of the other estimators we compute.

Third, we assume that the elasticities with respect to the terms of trade (the β coefficients) are constant over time and across countries. We test both of these hypotheses. To investigate temporal stability, we split up the sample into the subperiods 1965-1980 and 1981-1989; since they roughly correspond to the periods of rising and of falling terms of trade, this also allows us to check whether the responses to positive and to negative terms-of-trade shocks differ. As detailed in Appendix II, table 3, the null hypothesis of identical β coefficients across the two subperiods is generally supported by the F-test described in Hsiao (1986), chapter 2.2, equation 2.2.20; where the differences across subperiods are statistically significant, they are typically quantitatively unimportant. This suggests there are no significant asymmetries in the response to rising and to falling terms of trade.

In contrast, as detailed in Appendix III, the null hypothesis of stability across countries is always rejected at the 1% significance level by the F-test described in Hsiao (1986), chapter 2.2, equation 2.2.15. The rejection is hardly surprising, given that we are dealing with such a broad sample of countries, but it does imply that we must look at country-specific regressions to determine how representative the panel estimates are. These country-by-country regressions are accordingly presented in Appendix III.

Finally, note that our fixed-effects estimator is only BLUE if we interpret the country-specific effects α_i as fixed regressors. To forecast an out-of-sample response to a terms-of-trade shock, we must however treat the α_i's as random errors; our estimator is then in general not BLUE, but is still preferable to the random-effects estimator since it is consistent even when the α_i's are correlated with the explanatory variables.

B. Omitted variable bias

The issue of bias from omitted variables needs to be treated differently in a panel context. To see this, it is convenient to define the mean across time for any given country and variable, x, as:

$$\bar{x}_i = \frac{1}{T}\sum_{t=1}^{T} x_{it} \quad , \tag{4}$$

and the deviations from country-means as:

$$\hat{x}_{it} = x_{it} - \bar{x}_i \quad . \tag{5}$$

Re-written in terms of deviation data, equation (1) then becomes

$$\hat{y}_{it} = \beta \hat{TOT}_{it} + \epsilon_{it} \quad . \tag{6}$$

Say that the true model is instead given by

$$\hat{y}_{it} = \beta \hat{TOT}_{it} + \gamma \hat{OMITTED}_{it} + \epsilon_{it} \quad . \tag{7}$$

If equation (5) were estimated by OLS for each country, the bias b_i in our estimator of β, treating the regressors as fixed, would be

$$b_{iT} = \frac{\sum_{t=1}^{T} \hat{TOT}_{it} \cdot \gamma \hat{OMITTED}_{it}}{\sum_{t=1}^{T} \hat{TOT}_{it}^2} \tag{8}$$

Hence, a necessary and sufficient condition for the country-by-country OLS estimates of β to be consistent is that asymptotically the terms of trade be orthogonal to any omitted variables:

A1. $\lim(T\to\infty)\, b_{iT} = 0.$

Now say that equation (5) is estimated in a panel context. The bias in our estimator of β is then

$$b_T = \frac{\sum_{i=1}^{I}\sum_{t=1}^{T} \hat{TOT}_{it} * \gamma OMITTED_{it}}{\sum_{i=1}^{I}\sum_{t=1}^{T} \hat{TOT}_{it}^2} \tag{9}$$

$$= \sum_{i=1}^{I} b_{iT} \frac{\sum_{t=1}^{T} \hat{TOT}_{it}^2}{\sum_{i=1}^{I}\sum_{t=1}^{T} \hat{TOT}_{it}^2} \quad . \tag{10}$$

Hence, a necessary and sufficient condition for the panel estimates of β to be consistent is that asymptotically a *weighted average* of the country-specific biases be zero:

A2. $\lim(T\to\infty) \sum_i a_{iT} b_{iT} = 0.$

Clearly, A1 implies A2 but not the reverse: there are many ways for assumption A2 to be satisfied without any of the countries individually satisfying assumption A1. The important point is that for the panel estimates to be consistent, it is unnecessary for the terms of trade to be asymptotically orthogonal to the omitted variables in *any* country: what matters is that the country-specific asymptotic biases be negatively correlated across countries so that they average to zero. This latter assumption is more credible to the extent that the relationship between the omitted variables and the terms of trade is idiosyncratic to each country and not positively correlated across countries.

Of course, to the extent that the omitted variables are world variables which affect all countries, then the b_i terms will tend to have the same signs and assumption A2 may fail. We therefore control for the debt crisis and for world interest rates. It might also be desirable to control for world output, but since periods of rising oil prices coincided with changes in OECD activity that would have depressed growth in our sample, and vice-versa, this would probably strengthen the links we find between terms-of-trade changes and activity variables.

The additional issue of the weights, a_i, is unlikely to be important for our sample. Countries have larger than average weights to the extent that the sample variability of their terms-of-trade data is larger than average. Since our sample consists of oil exporters, the variability of their terms of trade is similar.

C. Non-stationarity

There are two ways to interpret our econometric model. First, we may view the terms of trade (which are driven mainly by the oil price) as a fixed regressor. Equations (1) and (2) are then the mechanism generating the rest of the data. The presence or absence of stationarity is not an issue in this framework.

Alternatively, we may treat the terms of trade as being generated by some time-series statistical model. Here, the order of integration of our data is an issue. Unfortunately, little is known about how to test for and deal with nonstationarity in a panel data setting. When estimating equation (2) for each country in isolation, we carry out an Engle-Granger co-integration test, using the augmented Dickey-Fuller statistics. For most countries and many variables, we cannot reject the null hypothesis that the regression residuals are integrated of order 1. However, given that such tests are well known for their very low power, and given the paucity of observations at the single-country level, we do not feel there is much strong evidence that our data is non-stationary in the sense that it trends over time.

V. Results

A. The importance of investment

Overall, we find fairly strong evidence that the relationship between terms-of-trade shocks and investment is positive. The panel regression suggests the 95% confidence interval (0.500, 0.675) for the long-run elasticity. In country by country regressions, 14 of the 18 countries have positive elasticities and of the 14, 13 are statistically significant. This section examines what the available evidence says about the sectoral breakdown and the causes of this investment effect, and how this investment effect is crucial to understanding other effects such as those on the trade balance and on growth.

It is likely that much of this investment occurred in the nontradable sector of the economy. Although data on investment by sector is simply not available for most of these countries,[1] and therefore this claim cannot be supported directly, much of the other data we do have is supportive. First, there is strong evidence that the relative price of nontradables were positively associated with the terms-of-trade shocks. So there seems to have been a clear price incentive for investment in these sectors. Second, we do have evidence that in the long run output expanded in nontradable sectors such as construction and transportation. It seems reasonable to think that this rise was made possible by a higher capital stock in these sectors.

This investment effect in nontradables can be explained formally in a variety of intertemporal optimizing models of investment (recent examples in the literature include Schmidt-Hebbel & Serven (1993) and Warner (forthcoming, 1994)). These models usually conclude that aggregate private investment is determined by the ratio of Tobin's q (the present discounted value of future marginal value products of capital in a given sector) to the relevant price deflator for investment goods. Since the countries in our sample import many capital goods, and the world prices of capital goods did not change dramatically over the period, the price of nontradables relative to physical capital probably rose in the 1970's and declined in the 1980's, causing similar changes in investment in the nontradable sector.

Turning to the oil sector, one might think that relative price changes would also stimulate investment there. Although this would probably hold for countries experiencing exogenous changes in their export prices, it is important to remember that OPEC raised oil prices in the 1970's partly through a deliberate policy of output restriction, so that for much of our period the oil sector was engineering price changes rather than passively responding to them. In such a setting, where countries exercise their power in the world oil market, it is *a priori* unclear which way the incentives work for investment in the oil sector. Oil production quotas may be seen as a permanent ceiling on oil production, leaving little reason to invest. On the other hand, an increase in productive capacity may strengthen one's hand in the periodic quota negotiations.

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[1] An exception is Warner (1994), where it is shown that investment in Mexican private non-tradables did decline over 1981-85. That study also suggests that an important mechanism for the investment decline was the fall in the ratio of nontradable prices to imported equipment prices, and that the terms-of-trade decline can explain most of the reduction in this relative price.

Therefore, we cannot deduce from theory whether investment should have risen or declined in the oil sector.

We do know that real oil output per capita did not rise over the long run between 1973 and 1981. It may be that countries invested in modernizing the oil sector rather than in expanding its capacity. It may also be that they did invest in expanding capacity but just did not use this capacity fully over the period. We simply do not have the data to pin this down very precisely.

However, it is clear that overall investment responded positively to the terms of trade, and this helps explain why the trade balance was strongly negatively related to terms-of-trade shocks, even though the export price effect in isolation should cause a higher trade surplus.

B. Consumption, Savings, and the Current Account

As discussed above, theory suggests that after a permanent positive terms-of-trade shock, consumption should rise, and savings should as a first approximation be unaffected. The data broadly confirms these implications. The only exceptions were Ecuador, Egypt, Syria, Kuwait, and the Emirates, which displayed an insignificant or indeed negative consumption response to the terms-of-trade shock. However, the former three countries were not really oil exporters before the first oil price shock, which consequently had a smaller positive impact on their wealth. For Kuwait and the Emirates, the shock seems to have induced a large increase in the consumption of leisure, made up for by extensive immigration which pushed down average levels of consumption per capita. The data also suggests government consumption may respond almost twice as strongly as private sector consumption, perhaps because governments systematically view shocks as more permanent than is the case. Numerically, panel estimates suggest the 95% confidence interval (0.310, 0.426) for the elasticity of consumption with respect to the terms of trade.

Given the lack of an impact on savings, and the strong response of investment, the trade balance and current account should be expected to decrease, and without exception these were the estimated responses.

C. Nontradable Prices and Quantities

Terms-of-trade shocks are very strongly associated with real exchange rate appreciation, i.e., increases in the relative price of nontradables. Panel estimates of the elasticity suggest the 95% confidence interval (-

0.606, -0.695), and only Congo displayed an insignificant response. The shocks are also associated with significant increase in value added within each category of nontradables. This confirms the importance of spending effects as a key mechanism in the transmission of terms-of-trade shocks to the rest of the economy: higher wealth leads to greater demand for nontradables, and hence to an increase in their relative prices and quantities. At a country level, the main exception was Ecuador, which displayed insignificant responses in the value added of each nontradable sector.

D. Dutch Disease Effects

The literature strongly focuses on Dutch Disease effects; here, the two non-oil tradables (agriculture and manufacturing) are the closest approximation we have to a Dutch Disease sector. Yet we failed to detect clear contractions in either of them in response to a rise in the price of oil; the only exception was Nigerian agriculture. Oil value added did respond negatively over the subperiod 1965-1981, but this simply reflects the imposition of OPEC quotas: the oil sector is best not viewed as facing exogenously given terms of trade, since part of OPEC's strategy at the time clearly was to engineer price rises by restraining output.

The absence of Dutch Disease effects may be partly explained by either the compression in the output of the oil sector, or by its typically being an 'enclave' sector which does not participate in domestic factor markets. Both factors would act to reduce the pull of resources away from other sectors, as mentioned in the theoretical section. Nevertheless, as discussed above, the spending effect was operational, increasing relative prices and output in the nontradable sector. To the extent that the nontradable sector may be competing with agriculture and manufacturing for scarce factors of production, or if nontradables are themselves intermediate inputs into other sectors, one might have expected a small bout of the Dutch Disease.

E. Growth

Given that the relative prices between oil and other products changed so dramatically over the period, and that the oil sector is so important in our sample, extremely serious index number problems arise in even defining and measuring aggregate output. We therefore feel that it is not analytically useful to talk about the aggregate economy, and we instead separate the oil from the non-oil sector. The former has already been mentioned. In the non-oil aggregate, we do see an effect on GDP, driven mainly by the expansion

in nontradables; Ecuador and Nigeria were the only countries with insignificant responses. Given our evidence on investment, this response is best seen as being driven by capital formation in the nontradable sector. Numerically, panel estimates of the elasticity of non-oil value added with respect to the terms of trade suggest the 95% confidence interval (0.206, 0.297). This is however influenced by outliers; the median elasticity from the country regressions is 0.381.

VI. Some Warnings regarding Extrapolation

When interpreting and above all extrapolating our results, several issues must be considered. First, the causes of the oil price shock were different from the causes of the forecast future increase in primary commodity prices. In our sample export prices rose because of oligopolistic coordination aimed at reducing output. Some responses might well be different for a truly exogenous terms-of-trade shock. In particular, both investment and output in the favored sector would probably rise; since output was no longer constrained, we should also expect a bigger increase in wealth and hence consumption.

Second, our results need only be valid for a permanent change in the terms of trade. A temporary terms-of-trade shock may lead to some intertemporal substitution in consumption and investment, but is unlikely to cause a permanent change in output.

Third, an economy's response to an increase in the price of primary commodities will clearly hinge on how dependent it is on primary exports. Its investment response will also depend on what share of its capital goods is imported.

Fourth, we might expect the availability of external finance to be a crucial factor interacting with changes in the terms of trade, and oil exporters in the 1970's probably enjoyed better access to the world capital markets than is true of the developing world today. On the other hand, this may well change if the trends in commodity prices change.

Fifth, in the 1970's and 1980's oil-exporters wasted a lot of their windfall revenues on prestige projects with little impact on output. Presumably, developing countries have by now learnt the lesson, and next time around will make better use of their luck.

VII. Conclusions

We considered a panel of oil-exporters that import a significant fraction of their capital goods. We found that permanent terms-of-trade shocks have no impact on savings, a strong positive impact on investment, and a negative impact on the current account. There is also evidence of a long-run effect on output, particularly of non-tradables. Real exchange-rate appreciations are a key mechanism in triggering the resource reallocation. We failed to find any evidence that the Dutch disease is a major phenomenon. Finally, the response of expenditure to terms-of-trade shocks is not very sensitive to whether the expenditure comes from the public or private sector.

As discussed in section VI, estimating an in-sample response to a terms-of-trade shock is much easier than forecasting an out-of-sample response. While our qualitative results may hold in quite general contexts, our quantitative estimates almost certainly will not. Let us nevertheless try to obtain some idea of the potential impact of the forecast increase in commodity prices on the growth rate of commodity exporters. As a lower-bound scenario, assume that the commodity sector does not grow at all, that the non-commodity sector accounts for 75% of GDP, and that it responds like the non-oil sector in our sample. An increase in the trend growth rate of commodity prices from -1.5% p.a. to 0.7% p.a. then implies an increase in the order of 0.6% in the trend growth rate of per capita GDP at constant prices. To the extent that commodity output increases, and that this does not pull resources away from the rest of the economy, the growth effect is magnified.

Appendix I: Full Data Description and Sources.

We consider the period 1965-1989. Our sample consists of the 18 oil-exporters listed below.

Algeria	Gabon	Mexico	Trinidad and Tobago
Bahrain	Indonesia	Nigeria	United Arab Emirates
Congo	Iran	Oman	Venezuela
Ecuador	Iraq	Saudi Arabia	
Egypt	Kuwait	Syria	

For all countries, fuels accounted for over 50% of total exports over at least half the sample period; for most countries, fuels accounted for over 70% of total exports over at least three quarters of the sample period. We used data on the following variables:

(1) Terms of Trade (TOT), computed as Merchandise exports deflator US Dollar (USD) / merchandise imports deflator USD, base 1987 = 1.0.

(2) A Debt Crisis dummy (DEBT), set to unity for Ecuador, Mexico, Nigeria and Venezuela over 1982-1989, and to zero elsewhere.

(3) World Real Interest Rates (INTRATE), as computed by Barro and Sala-i-Martin.

(4) The Real Exchange Rate (REALEXRA), or relative price of tradables to nontradables. This is computed as USA GDP deflator USD / local GDP deflator USD, index 1987.

(5) Gross Domestic Product (GDP), per capita, constant 1987 market prices, Local Currency Unit (LCU).

(6) Gross National Product (GNP), per capita, constant 1987 market prices, LCU.

(7) Consumption (CONS), per capita, constant 1987 prices, LCU.

(8) Private Consumption (CONSPRIV), per capita, constant 1987 prices, LCU.

(9) General Government Consumption (CONSGOVT), per capita, constant 1987 prices, LCU.

(10) Gross Domestic Savings (SAVINGS), per capita, constant 1987 prices, LCU.

(11) Fixed Investment (INVT), per capita, constant 1987 prices, LCU.

(12) Private fixed Investment (INVTPRIV), per capita, constant 1987 prices, LCU.

(13) General Government fixed Investment (INVTGOVT), per capita, constant 1987 prices, LCU.

(14) Balance of merchandise Trade (TRADBALA), per capita, constant 1987 prices, LCU.

(15) Value added in the Oil sector, constant prices (OILVA), LCU.

(16) Value added in the Non-oil sector (NONOILVA), constant prices, LCU.

(17) Value added in Agriculture (AGRICULT), constant prices, LCU.

(18) Value added in Manufacturing (MANUFACT), constant prices, LCU.

(19) Value added in Construction (CONSTRUC), constant prices, LCU.

(20) Value added in Public Utilities (UTILITY), constant prices, LCU.

(21) Value added in Services (SERVICES), constant prices, LCU.

(22) Value added in Transportation and Communications (TRANSPORT), constant prices, LCU.

(23) Value added in Wholesale and Retail Trade (TRADE), constant prices, LCU.

(24) Value added in Other Services (OTHRSERV), constant prices, LCU.

(25) Total Labor force (LABOR).

Variables 1, 4 .. 14 and 25 came from the World Bank's DAD database (except for Mexico's terms of trade, obtained from Mexico's central bank), and variables 2 and 3 are as described above. They are available for all countries for the whole period.

Variables 17, 18 and 21 were from the World Bank's STARS database, and all other variables came from World Bank Country Economic Memoranda. They were not available for Iraq, nor before 1969.

In all cases, the ultimate sources are national central banks, national statistical services, and estimates by World Bank missions.

Appendix II: Full Panel Regression Results.

Table 1. Panel regression: $\ln y_{it} = \alpha_i + \beta \ln TOT_{it} + \varepsilon_{it}$. Sample period: 1973, 1981, 1989.

Dependent variable	Terms of trade Coefficient	Terms of trade T-ratio	R^2	σ	N
Ln Real exchange rate	-0.5617	-6.8338	0.5716	0.3973	54
Ln Consumption	0.3594	4.4355	0.3598	0.3917	54
Ln Private Consumption	0.3413	4.2327	0.3386	0.3898	54
Ln Govt Consumption	0.4085	4.1049	0.3250	0.4810	54
Ln Savings	0.0312	0.2177	0.0014	0.6939	54
Ln Investment	0.4780	4.3860	0.3547	0.5267	54
Ln Private Investment	0.4895	3.5540	0.2652	0.6656	54
Ln Govt Investment	0.5731	4.5936	0.3761	0.6030	54
Trade Balance	-15.1420	-2.8571	0.1936	24.9415	53
Ln GDP	-0.0123	-0.1613	0.0007	0.3689	54
Ln Oil value added	-0.3862	-1.7479	0.2763	0.9133	23
Ln Non-oil value added	0.2211	4.4454	0.7118	0.2055	23
Ln Agriculture	0.0706	0.7940	0.0220	0.3787	46
Ln Manufacturing	0.1710	1.2890	0.0767	0.5432	36
Ln Construction	0.3314	2.7997	0.4655	0.4852	25
Ln Public Utilities	0.2553	1.5724	0.2610	0.6039	21
Ln Services	0.0951	1.0117	0.0353	0.4003	46
Ln Transportation	0.1958	1.7262	0.2986	0.4323	22
Ln Trade	0.1419	0.8500	0.0936	0.5207	21
Ln Other services	0.2704	3.7993	0.6734	0.2713	22

Table 2. Panel regression: $\ln y_{it} = \alpha_i + \beta_1 \ln TOT_{it} + \beta_2 \ln TOT_{it-1} + .. + \varepsilon_{it}$.

Dependent variable	Terms of trade sum of coefficients	Terms of trade T-ratio	R^2	σ	N
Ln Real exchange rate	-0.6508	-28.7336	0.6747	0.2488	431
Ln Consumption	0.3681	12.5055	0.2766	0.3248	431
Ln Private Consumption	0.2902	10.2829	0.2105	0.3114	431
Ln Govt Consumption	0.5206	12.9296	0.2892	0.4442	431
Ln Savings	-0.0679	-1.1228	0.0636	0.6660	429
Ln Investment	0.5875	13.1991	0.3217	0.4706	413
Ln Private Investment	0.6831	11.7508	0.2902	0.6146	413
Ln Govt Investment	0.5970	12.3281	0.2874	0.5120	413
Trade Balance	-15.4053	-9.2591	0.2145	15.9832	395
Ln GDP	-0.0201	-0.7378	0.0158	0.3000	431
Ln Oil value added	-0.3640	-6.3850	0.2470	0.3548	178
Ln Non-oil value added	0.2519	10.8723	0.4316	0.1441	178
Ln Agriculture	0.0701	2.2620	0.0691	0.2155	293
Ln Manufacturing	0.2306	3.7061	0.0803	0.4022	240
Ln Construction	0.3967	9.1806	0.3581	0.2709	193
Ln Public Utilities	0.3163	6.3042	0.3226	0.2787	158
Ln Services	0.0965	2.7620	0.0276	0.2438	293
Ln Transportation	0.2332	5.4244	0.1758	0.2467	175
Ln Trade	0.2331	4.6300	0.1578	0.2382	158
Ln Other services	0.2606	9.7659	0.3833	0.1531	175

For the real exchange rate, the trade balance, non-oil value added, agriculture, construction, utilities, and trade, the regressor matrix also includes $DEBT_{it}$; in all the investment equations, it also includes $DEBT_{it}$ and ln $INTRATE_t$. Sample period: 1965-1989.

Table 3. Panel Regression: $\ln y_{it} = \alpha_i + \beta_1 \ln TOT_{it} + \beta_2 \ln TOT_{it-1} + .. + \varepsilon_{it}$. β coefficients unrestricted across the subperiods 1965-1980 and 1981-1989.

Dependent variable	Terms of trade sum of coef. 1965-1980	Terms of trade sum of coef. 1981-1989	P-value for coef. stability	R^2	σ	N
Ln Real exchange rate	-0.6746	-0.5484	0.0235	0.6807	0.2471	431
Ln Consumption	0.3791	0.3110	0.25	0.2815	0.3245	431
Ln Private Consumption	0.3042	0.2276	0.403	0.2140	0.3115	431
Ln Govt Consumption	0.5395	0.4211	0.0931	0.2974	0.4428	431
Ln Savings	-0.1439	0.1884	0.0894	0.0747	0.6637	429
Ln Investment	0.3124	0.3510	0	0.4505	0.4253	413
Ln Private Investment	0.4647	0.1246	0	0.3689	0.5819	413
Ln Govt Investment	0.2590	0.6564	0	0.4226	0.4627	413
Trade Balance	-16.9939	-10.9972	0.419	0.2181	15.9906	395
Ln GDP	-0.0488	0.0699	0.0893	0.0274	0.2990	431
Ln Oil value added	-0.4854	-0.0789	0.0258	0.2807	0.3491	178
Ln Non-oil value added	0.2449	0.2710	0.703	0.4341	0.1448	178
Ln Agriculture	0.1125	0.0087	0.259	0.0784	0.2153	293
Ln Manufacturing	0.2021	0.2877	0.281	0.0908	0.4018	240
Ln Construction	0.3898	0.4083	0.76	0.3601	0.2721	193
Ln Public Utilities	0.3213	0.3142	0.713	0.3258	0.2802	158
Ln Services	0.0842	0.1241	0.399	0.0341	0.2439	293
Ln Transportation	0.1601	0.4157	0.0798	0.2020	0.2445	175
Ln Trade	0.2396	0.2250	0.936	0.1585	0.2400	158
Ln Other services	0.2597	0.2674	0.53	0.3883	0.1536	175

For the real exchange rate, the trade balance, non-oil value added, agriculture, construction, utilities, and trade, the regressor matrix also includes $DEBT_{it}$; in all the investment equations, it also includes $DEBT_{it}$ and ln $INTRATE_t$. Sample period: 1965-1980, and 1981-1989. The P-value denotes the minimum significance level at which we can reject the null hypothesis of identical terms-of-trade coefficients across subperiods, using the F-test described in Hsiao (1986), ch. 2.2, equation 2.2.20.

Table 4. Share of capital goods in total imports in 1973, in 1981, and in the latest available year up to 1989 inclusive.

Country	Share of capital goods in the year 1973	1981	Latest	Latest available year– 1989 if not stated
Algeria	0.3720	0.3834	0.2570	
Congo	0.3868	0.3874	0.3620	1986
Ecuador	0.4117	0.4582	0.3397	
Egypt	0.2477	0.2816	0.2303	
Gabon	0.4066	0.4094	0.4009	1983
Indonesia	0.4104	0.3536	0.3774	
Iran	0.3779	0.2832	0.3884	1983
Iraq	0.3297	0.5328	0.4478	1983
Kuwait	0.3442	0.4103	0.2961	
Mexico	0.4438	0.4707	0.3260	
Nigeria	0.4012	0.4402	0.3812	1986
Oman	0.3101	0.3908	0.3685	
Saudi Arabia	0.3524	0.4047	0.3870	
Syria	0.2369	0.2171	0.2592	1986
Trinidad and Tobago	0.1313	0.2242	0.2729	
United Arab Emirates	0.3801	0.3568	0.3025	1986
Venezuela	0.4688	0.4344	0.4682	1988

Appendix III: Country-by-country Regression Results.

Sample period: 1965-1989. For each dependent variable, two regressions are carried out.

Regression 1: $\ln y_{it} = \alpha_{it} + \beta\ P(L) \ln x_{it} + e_{it}$, β identical across countries. Results are in the form:

Y variable	TOT Coef	TOT T-stat	Debt Coef	Debt T-stat	IntRate Coef	IntRate T-stat
	R^2	σ	N	P-value		

Regression 2: $\ln y_{it} = \alpha_{it} + \beta\ P(L) \ln x_{it} + e_{it}$, β unrestricted across countries. Results are in the form:

Country	TOT Coef	TOT T-stat	Debt Coef	Debt T-stat	IntRate Coef	IntRate T-stat
	R^2	σ	N	P-value		

The P-value in regression 1 refers to the Lagrange Multiplier test of the null hypothesis of no country-specific effects; the P-value in regression 2 to the F-test of the null hypothesis of coefficient stability across countries. Where a coefficient and its T-statistic are not reported, the corresponding variable was not included in the regression.

REALEXRA	-0.651	-28.7	0.325	6.07
	0.675	0.249	431	4.21e-17
Algeria	-0.447	-6.82		
Bahrain	-2.53	-13.6		
Congo	-0.0493	-0.257		
Ecuador	-0.263	-1.89	0.166	1.87
Egypt	-0.818	-3.69		
Gabon	-0.629	-6.29		
Indonesia	-0.467	-5.25		
Iran	-0.691	-11.5		
Iraq	-0.866	-12.3		
Kuwait	-0.728	-13.4		
Mexico	-0.637	-2.29	0.178	1.53
Nigeria	-0.731	-8	0.489	4.99
Oman	-0.853	-15.5		
Saudi Arabia	-0.783	-14.8		
Syria	-0.214	-1.55		
Tobago	-1.14	-5		
Emirates	-0.577	-9.97		
Venezuela	-0.359	-5.48	0.354	3.28
	0.804	0.203	431	2.7e-14
CONS	0.368	12.5		
	0.277	0.325	431	5.81e-07
Algeria	0.488	6.03		

Bahrain	0.917	4		
Congo	0.145	0.613		
Ecuador	-0.261	-1.57		
Egypt	-0.64	-2.34		
Gabon	0.682	5.54		
Indonesia	0.596	5.45		
Iran	0.292	3.95		
Iraq	0.186	2.15		
Kuwait	-0.00163	-0.0244		
Mexico	0.276	0.993		
Nigeria	0.327	3.25		
Oman	0.671	9.9		
Saudi Arabia	1.09	16.7		
Syria	-0.513	-3		
Tobago	0.794	2.84		
Emirates	-0.0429	-0.603		
Venezuela	0.225	3.32		
	0.609	0.25	431	0
CONSPRIV	0.29	10.3		
	0.21	0.311	431	1.94e-10
Algeria	0.48	6.25		
Bahrain	0.538	2.47		
Congo	0.202	0.898		
Ecuador	-0.23	-1.45		
Egypt	-0.666	-2.56		
Gabon	0.539	4.6		
Indonesia	0.544	5.23		
Iran	0.256	3.64		
Iraq	0.0561	0.682		
Kuwait	0.00356	0.056		
Mexico	0.297	1.12		
Nigeria	0.312	3.27		
Oman	0.425	6.59		
Saudi Arabia	0.99	16		
Syria	-0.502	-3.09		
Tobago	0.856	3.21		
Emirates	-0.232	-3.42		
Venezuela	0.23	3.57		
	0.581	0.237	431	0
CONSGOVT	0.521	12.9		
	0.289	0.444	431	3.82e-08

Algeria	0.51	4.34				
Bahrain	2.21	6.62				
Congo	-0.0562	-0.163				
Ecuador	-0.454	-1.88				
Egypt	-0.501	-1.26				
Gabon	1.03	5.74				
Indonesia	0.995	6.25				
Iran	0.418	3.89				
Iraq	0.371	2.95				
Kuwait	-0.0119	-0.123				
Mexico	0.106	0.263				
Nigeria	0.414	2.83				
Oman	1.03	10.5				
Saudi Arabia	1.23	13				
Syria	-0.557	-2.25				
Tobago	0.617	1.52				
Emirates	0.329	3.18				
Venezuela	0.195	1.97				
	0.567	0.363	431	0		
SAVINGS	-0.0679	-1.12				
	0.0636	0.666	429	9.34e-16		
Algeria	0.462	2.37				
Bahrain	2.76	4.5				
Congo	0.015	0.0264				
Ecuador	-1.14	-2.83				
Egypt	-0.212	-0.322				
Gabon	0.787	2.65				
Indonesia	1.4	5.31				
Iran	0.0746	0.419				
Iraq	-0.258	-1.24				
Kuwait	-0.76	-4.72				
Mexico	0.256	0.383				
Nigeria	-0.186	-0.768				
Oman	0.232	1.42				
Saudi Arabia	-0.288	-1.82				
Syria	-0.931	-2.27				
Tobago	1.09	1.62				
Emirates	-0.345	-2.01				
Venezuela	-0.271	-1.66				
	0.303	0.601	429	9.18e-11		
INVT	0.587	13.2	-0.368	-3.34	-0.00073	-1.11

	0.322	0.471	413	4.16e-10		
Algeria	0.743	6.04			-0.00298	-1.42
Bahrain	1.76	5.09			-0.00417	-1.99
Congo	0.282	0.618			0.00402	1.61
Ecuador	-0.246	-0.798	0.0597	0.248	-0.00117	-0.39
Egypt	-1.3	-2.81			0.00772	3.83
Gabon	1.41	7.3			-0.00653	-3
Indonesia	1.41	8.5			0.00233	1.13
Iran	0.401	3.57			-0.00636	-3.04
Iraq	1.03	7.63			-0.00198	-0.955
Kuwait	0.316	3.19			-0.00202	-0.975
Mexico	1.01	1.89	-0.0707	-0.264	0.000483	0.19
Nigeria	0.624	3.67	-0.389	-1.78	-0.00697	-2.69
Oman	0.68	6.84			-0.00163	-0.785
Saudi Arabia	1.33	13.7			-0.000509	-0.245
Syria	-0.554	-2.09			0.00413	1.98
Tobago	1.77	3.87			-0.000137	-0.0675
Emirates	-0.0034	-0.0322			-0.00318	-1.53
Venezuela	0.25	2.11	-0.487	-1.93	-0.00265	-1.05
	0.661	0.359	413	3.61e-27		
INVTPRIV	0.683	11.8	-0.675	-4.7	8.03e-05	0.0938
	0.29	0.615	413	3.01e-10		
Algeria	0.756	5.12			-0.00581	-2.31
Bahrain	1.74	4.2			-0.00449	-1.78
Congo	1.08	1.97			-0.000525	-0.175
Ecuador	-0.191	-0.516	0.0579	0.2	-0.00218	-0.603
Egypt	-0.749	-1.35			0.00223	0.92
Gabon	1.29	5.57			-0.00215	-0.825
Indonesia	1.36	6.82			0.00169	0.683
Iran	0.524	3.89			-0.00478	-1.9
Iraq	1.62	9.97			0.00611	2.45
Kuwait	0.0359	0.301			-0.000757	-0.305
Mexico	0.448	0.702	-0.141	-0.439	0.00053	0.173
Nigeria	0.495	2.43	-0.635	-2.42	-0.0115	-3.71
Oman	1.15	9.62			0.0094	3.77
Saudi Arabia	1.74	14.9			-0.00121	-0.486
Syria	-0.54	-1.69			0.00603	2.41
Tobago	1.54	2.8			0.00132	0.545
Emirates	-0.0215	-0.169			-0.00389	-1.56
Venezuela	0.00987	0.0694	-0.488	-1.61	-0.0044	-1.46
	0.701	0.432	413	7.07e-38		

INVTGOVT	0.597	12.3	-0.173	-1.44	-0.00084	-1.18
	0.287	0.512	413	6.48e-15		
Algeria	0.737	5.3			0.00205	0.865
Bahrain	1.8	4.61			-0.0035	-1.48
Congo	-0.747	-1.45			0.0096	3.41
Ecuador	-0.332	-0.953	0.0624	0.229	0.000259	0.0761
Egypt	-1.88	-3.59			0.0115	5.03
Gabon	1.51	6.9			-0.0139	-5.68
Indonesia	1.5	7.98			0.00315	1.35
Iran	0.289	2.27			-0.00791	-3.34
Iraq	0.973	6.36			-0.00273	-1.16
Kuwait	0.444	3.96			-0.00245	-1.05
Mexico	2.05	3.41	0.072	0.238	0.000309	0.107
Nigeria	0.699	3.64	-0.266	-1.08	-0.00326	-1.11
Oman	0.583	5.18			-0.004	-1.7
Saudi Arabia	1.1	9.97			-0.000543	-0.231
Syria	-0.537	-1.79			0.00311	1.32
Tobago	2.06	3.98			-0.00255	-1.12
Emirates	0.00568	0.0475			-0.00271	-1.15
Venezuela	0.606	4.52	-0.471	-1.65	-0.00213	-0.747
	0.616	0.406	413	4.86e-14		
TRADBALA	-15.4	-9.26	-11	-3.17		
	0.214	16	395	4.07e-13		
Algeria	-2.71	-1.21				
Bahrain	-2.55	-0.362				
Congo	-1.92	-0.267				
Ecuador	-3.2	-0.666	-0.246	-0.081		
Egypt	-0.615	-0.0809				
Gabon	-5.58	-1.64				
Indonesia	-85.3	-28.1				
Iran	-2.31	-1.03				
Iraq	-1.26	-0.506				
Kuwait	-1.37	-0.582				
Mexico	-1.96	-0.207	0.179	0.0449		
Nigeria	-5.06	-1.62	1.09	0.323		
Oman	-4.06	-0.781				
Saudi Arabia	-0.522	-0.277				
Syria	-0.784	-0.138				
Tobago	-9.82	-1.27				
Emirates	-1.73	-0.676				
Venezuela	-77.1	-32.2	-1.03	-0.281		
	0.868	6.93	395	3e-108		

GDP	-0.0201	-0.738		
	0.0158	0.3	431	3.55e-12
Algeria	0.249	3.18		
Bahrain	0.051	0.231		
Congo	-0.065	-0.284		
Ecuador	-0.478	-2.97		
Egypt	-0.776	-2.94		
Gabon	0.607	5.1		
Indonesia	0.516	4.88		
Iran	0.0491	0.687		
Iraq	-0.198	-2.38		
Kuwait	-0.589	-9.13		
Mexico	0.261	0.972		
Nigeria	-0.0206	-0.212		
Oman	0.352	5.37		
Saudi Arabia	0.17	2.69		
Syria	-0.35	-2.12		
Tobago	0.69	2.55		
Emirates	-0.324	-4.71		
Venezuela	-0.142	-2.17		
	0.419	0.241	431	0
GNP	0.0163	0.621		
	0.0112	0.289	431	2.04e-14
Algeria	0.255	3.34		
Bahrain	-0.189	-0.871		
Congo	0.00967	0.0432		
Ecuador	-0.419	-2.66		
Egypt	-0.753	-2.92		
Gabon	0.589	5.06		
Indonesia	0.495	4.79		
Iran	0.0917	1.31		
Iraq	-0.146	-1.78		
Kuwait	-0.472	-7.48		
Mexico	0.274	1.04		
Nigeria	0.000775	0.00816		
Oman	0.325	5.07		
Saudi Arabia	0.288	4.68		
Syria	-0.336	-2.09		
Tobago	0.797	3.01		
Emirates	-0.313	-4.66		
Venezuela	-0.126	-1.96		
	0.399	0.236	431	0

OILVA	-0.364	-6.39		
	0.247	0.355	178	4.32e-43
Algeria	-0.122	-0.916		
Bahrain	1.1	1.51		
Congo	1.09	1.01		
Ecuador	-0.138	-0.398		
Egypt	1.94	2.38		
Indonesia	0.00744	0.0191		
Iran	-0.776	-6.38		
Kuwait	-0.537	-2.16		
Mexico	-0.173	-0.46		
Nigeria	0.187	0.524		
Oman	-0.202	-0.326		
Saudi Arabia	-0.198	-2.01		
Tobago	-1.16	-1.04		
Venezuela	-0.559	-4.93		
	0.462	0.33	178	0.00347
NONOILVA	0.252	10.9	-0.0682	-1.72
	0.432	0.144	178	8.75e-44
Algeria	0.336	7.39		
Bahrain	0.235	0.952		
Congo	0.92	2.51		
Ecuador	-0.0364	-0.355	0.137	2.32
Egypt	0.754	2.71		
Indonesia	0.591	3.74		
Iran	0.28	6.75		
Kuwait	0.091	1.07		
Mexico	0.417	2.48	0.102	1.48
Nigeria	-0.00423	-0.0332	-0.117	-0.938
Oman	0.847	4.01		
Saudi Arabia	0.381	11.3		
Tobago	0.836	2.21		
Venezuela	0.0778	1.72	-0.246	-3.29
	0.721	0.113	178	3.54e-10
AGRICULT	0.0701	2.26	-0.167	-3.39
	0.0691	0.216	293	2.33e-18
Algeria	0.183	2.08		
Bahrain	0.607	1.36		
Congo	0.00972	0.0466		
Ecuador	-0.108	-0.631	-0.00651	-0.0722
Egypt	0.001	0.00387		

Gabon	-0.0547	-0.208		
Indonesia	0.151	1.29		
Iran	0.0964	1.18		
Kuwait	0.17	2.21		
Mexico	0.228	0.744	-0.079	-0.601
Nigeria	-0.193	-2.11	-0.216	-2.06
Oman	-0.203	-1.25		
Saudi Arabia	0.0405	0.533		
Syria	0.63	2.41		
Tobago	0.955	4.13		
Emirates	0.14	0.709		
Venezuela	-0.0647	-0.756	-0.081	-0.768
	0.304	0.2	293	0.000138
MANUFACT	0.231	3.71		
	0.0803	0.402	240	3.25e-28
Algeria	0.298	1.84		
Bahrain	-0.227	-0.239		
Congo	-0.0879	-0.188		
Ecuador	0.232	0.737		
Gabon	0.278	0.578		
Indonesia	0.918	4.26		
Iran	0.199	1.33		
Kuwait	0.233	0.73		
Mexico	0.193	0.468		
Nigeria	0.188	1.2		
Oman	-0.571	-1.92		
Saudi Arabia	0.102	0.733		
Tobago	0.922	2.18		
Emirates	1.53	4.24		
Venezuela	0.0121	0.0833		
	0.332	0.368	240	5.92e-05
CONSTRUC	0.397	9.18	-0.306	-4.19
	0.358	0.271	193	1.44e-28
Algeria	0.714	9.07		
Bahrain	0.382	0.893		
Congo	2.4	3.78		
Ecuador	0.00434	0.026	-0.0965	-1.03
Egypt	0.945	1.96		
Indonesia	0.707	3.08		
Iran	0.053	0.739		
Kuwait	0.133	0.906		

Mexico	0.475	1.63	0.0674	0.567
Nigeria	0.64	2.91	-0.488	-2.26
Oman	1	2.75		
Saudi Arabia	0.704	12.1		
Syria	0.79	1.96		
Tobago	1.9	3.93		
Venezuela	0.232	2.95	-0.825	-6.37
	0.732	0.195	193	2.5e-15
UTILITY	0.316	6.3	0.259	3.21
	0.323	0.279	158	1.85e-50
Bahrain	0.074	0.131		
Congo	0.235	0.28		
Ecuador	-0.271	-1.22	0.603	4.86
Egypt	1.02	1.6		
Indonesia	0.492	1.62		
Iran	0.354	3.73		
Kuwait	0.138	0.709		
Mexico	1.56	2.2	0.429	2.46
Nigeria	0.491	1.68	0.0379	0.133
Oman	1.25	2.59		
Saudi Arabia	0.406	4.94		
Tobago	1.17	1.83		
Venezuela	0.202	1.94	0.11	0.639
	0.536	0.259	158	0.00748
SERVICES	0.0965	2.76		
	0.0276	0.244	293	1.22e-20
Algeria	0.114	1.16		
Bahrain	0.357	0.713		
Congo	0.588	2.52		
Ecuador	0.0865	0.45		
Egypt	-0.449	-1.55		
Gabon	0.277	0.942		
Indonesia	0.497	3.76		
Iran	0.0653	0.713		
Kuwait	-0.296	-3.43		
Mexico	0.17	0.676		
Nigeria	0.316	3.31		
Oman	0.0162	0.0887		
Saudi Arabia	0.188	2.2		
Syria	0.985	3.36		
Tobago	0.489	1.88		

Emirates	0.19	0.859		
Venezuela	-0.0328	-0.369		
	0.277	0.225	293	2.01e-05
TRANSPORT	0.233	5.42		
	0.176	0.247	175	5.47e-52
Bahrain	0.962	1.99		
Congo	1.18	1.64		
Ecuador	-0.00442	-0.0236		
Egypt	1.63	2.99		
Indonesia	0.636	2.46		
Iran	0.428	5.28		
Kuwait	0.106	0.641		
Mexico	1.58	2.73		
Nigeria	0.37	1.55		
Oman	1.46	3.53		
Saudi Arabia	0.144	2.18		
Syria	0.507	1.12		
Tobago	1.25	2.3		
Venezuela	0.0341	0.451		
	0.46	0.22	175	0.000119
TRADE	0.233	4.63	-0.132	-2.05
	0.158	0.238	158	4.43e-47
Bahrain	1.1	2.75		
Congo	1.59	2.69		
Ecuador	-0.0376	-0.242	0.111	1.27
Egypt	1.25	2.8		
Indonesia	0.304	1.42		
Iran	0.569	8.51		
Kuwait	0.16	1.17		
Mexico	0.344	1.27	0.0616	0.556
Nigeria	0.00838	0.0409	-0.0632	-0.315
Oman	1.04	3.06		
Syria	0.443	1.18		
Tobago	0.914	2.03		
Venezuela	-0.0189	-0.26	-0.373	-3.09
	0.61	0.182	158	6.55e-10
OTHRSERV	0.261	9.77		
	0.383	0.153	175	1.14e-50
Bahrain	-0.554	-2.02		
Congo	0.634	1.56		

Ecuador	0.0369	0.347		
Egypt	0.816	2.65		
Indonesia	0.437	2.98		
Iran	0.305	6.64		
Kuwait	-0.0263	-0.28		
Mexico	0.389	1.19		
Nigeria	0.00246	0.0182		
Oman	0.576	2.46		
Saudi Arabia	0.42	11.3		
Syria	0.7	2.72		
Tobago	0.861	2.78		
Venezuela	0.0801	1.87		
	0.663	0.125	175	1.53e-08

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