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Did the Debt Crisis or Declining Oil Prices Cause Mexico's Investment Collapse?

Andrew M. Warner

Commodity price shocks (such as the decline in oil prices) have been underestimated as a direct cause of declining investment in the 1980s.

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This paper — a product of the International Economic Analysis and Prospects Division, International Economics Department — is part of a larger effort in the department to examine the impact of external shocks on low and middle-income countries. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Mila Divino, room S8-013, extension 33739 (February 1993, 31 pages).

Warner proposes and estimates a microeconomic investment model to determine the relative importance of three explanations for Mexico's investment decline in the early 1980s:

- The decline in oil prices.
- The termination of capital inflows.
- The effects of debt overhang and uncertainty.

He uses investment data for private industries between 1981 and 1985, which have yet to be used in addressing the question under discussion.

The data indicate that the main microeconomic mechanism driving the decline in investment was a rise in the relative price of investment goods — especially the relative price of machinery (a traded good in Mexico). Moreover, the decline in trade (driven by falling world oil prices) explains much of the increase in this relative price.

The decline in Mexico's international terms of trade was probably the most important ultimate cause of the increased relative cost of machinery, but the reversal in net capital inflows to Mexico probably also played a role in increasing this relative price. On this point, the evidence is not as clear.

After controlling for these effects, Warner finds little evidence that the effects of debt overhang and uncertainty had much to do with the investment decline.

Warner points out that investment in Texas and Louisiana (which were also riding the oil boom of 1973-81) also fell in 1981-86, and adverse commodity price shocks also affected many other heavily indebted countries. At the very least, commodity price shocks (such as Mexico's decline in oil prices) as a direct cause of declining investment levels in the 1980s have been insufficiently emphasized in the literature on the effects of the international debt crisis.

Did the Debt Crisis or the Oil Price Decline Cause Mexico's Investment Collapse?

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[1] This paper is a revision of chapter 2 my dissertation and of International Finance Discussion Paper #416, Federal Reserve Board. It has benefitted from comments and discussions with Susan Collins, Ashok Dhareshwar, Steve Kamin, Yves Maroni, Jeffrey Sachs. Carlos Sales, Oscar Sanchez, Larry Summers, Jeffrey Williamson, Ning Zhu and two especially helpful anonymous referees.

Table of Contents

1. Introduction.

It is not necessarily surprising to learn that investment declined in a country when the world price of its key export declined by about 50 percent. Yet the investment decline in Mexico in the early 1980s is almost universally attributed to some aspect of the international debt crisis or to general uncertainty rather than to the decline in the price of oil. The possibility that the oil price decline would have reduced investment even in the absence of the debt crisis is rarely seriously considered. Instead, the usual argument is that the oil price decline helped cause the debt crisis, and then some other phenomena associated with the debt crisis, such as the debt-overhang, or heightened uncertainty about policy reforms, in turn caused the investment decline.

Sorting out the role of the oil price decline versus the debt crisis is important because the view that Latin America's economic problems in the 1980s were caused by debt problems is an important premise in many policy discussions. Empirical studies attempting to estimate the effect of the debt crisis (broadly defined) on investment have only recently begun to appear: Cohen (1990), Faini and de Melo (1990), Fry (1989), Hofman and Reisen (1990), Savvides (1992) and Warner (1992), and so far there is no consensus. These studies analyze entire groups of less developed countries and focus on investment aggregates from national accounts data. This paper takes a more targeted approach: focussing on a country and a data set where it is possible to define and estimate the effects more precisely.

The main focus of this paper is to distinguish empirically between three possible causes for Mexico's investment decline in the early 1980s: the oil price decline, the termination of capital inflows, and debt-overhang/uncertainty effects. The second goal of the paper is to help fill a gap in the literature by providing structural estimates of a private sector investment demand function in a small open economy. It is fortunate that good data are available for Mexico during a period when the available instruments (world oil prices, world interest rates) exhibited substantial variation. Thus there may also be sufficient statistical information to try to identify structural parameters.

The data are from a sector-level investment survey conducted in Mexico between the first quarter of 1981 and the last quarter of 1985, which has not yet received much attention. This data set has several virtues: it spans the crucial debt-crisis year of 1982, is of fairly high quality, permits explicit controls for industry-specific investment determinants such as relative product prices and wages, and permits a focus on industries which are in the private sector.

I begin with an assumption that concedes ground to the debt crisis side of this debate. That is, I will assume that the sudden termination of international capital flows to Mexico, which happened in 1982, was exogenous instead of being caused by the continued decline in the price of oil, which began in the middle of 1981. This assumption will lead to an underestimate of the magnitude of the oil price effect, because it rules out any effect of the oil price decline working through the capital flow variable. The paper will show that despite this assumption, the data suggests that the effect of the oil price decline was large.

This paper is organized as follows. Section 2 surveys the main facts for Mexico. Section 3 presents a micro-economic investment model. Section 4 spells out how the terms of trade decline and the debt crisis relate to this investment model. Section 5 discusses the data and econometric issues. Sections 6 and 7 present results using quarterly and annual data, respectively. Section 8 concludes.

2. Important Dates and Movements in Key variables

Mexico's debt problems in 1982 are usually attributed to the combined effect of high world real interest rates, falling oil prices, and an inability of Mexican policy makers and their international creditors to adjust to these new realities. The main facts are as follows. Between 1980 and 1982, world real interest rates were very high by any measure. In July of 1981, world oil prices began to decline. In February of 1982, Mexico devalued the peso by 46 percent and devalued again in August of 1982. Throughout early 1982, macro economic reforms were repeatedly announced but only partially implemented. Through July of 1982, international creditors were still lending heavily to Mexico. On

August 12, 1982, Mexico announced to the surprise of the international community that it could not meet its short term obligations falling due in the coming week. By 1983, new capital inflows had virtually stopped, Mexico was transferring resources abroad, and investment and growth were sharply lower than the levels achieved in 1980 and 1981.

The investment decline after 1981 was severe by any measure. Real investment data from the national accounts show that average annual real investment in the period 1983-1985 was 63 percent of the 1981 level, and the decline was roughly similar for public and private investment. The same calculation using the investment survey data puts this number at 53 percent.

Apart from debt crisis effects, the two key exogenous variables this paper considers to explain this decline are the terms of trade and net capital inflows.[1] The capital inflow variable is the sum of net capital inflows from the capital account (not including changes in official reserves) net interest payments, and errors and omissions, all measured in billions of dollars and all deflated by the U.S producer price index (1982= 1.0).[2] In 1981, net capital inflows averaged $1.8 billion per quarter; in 1985, there was a net outflow averaging $3.0 billion per quarter.

The terms of trade, defined as the ratio of export prices to import prices, also declined substantially during this period. Driven by the decline in the world price of oil, the terms of trade fell by almost 30 percent between 1981 and 1985 (using annual averages), and then fell a further 23 percent in 1986. The decline in the terms of trade started in the middle of 1981, clearly preceding the debt

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[1] The assumption that capital flows were exogenous is made more for the sake of the argument than for realism. The capital flow reversal was probably caused in part by the continuing fall in the price of oil as well as the sudden questioning of Mexico's solvency by its creditors. In contrast, the assumption that Mexico's terms of trade decline was exogenous is easier to defend because world oil prices were the key variable driving this index and Mexico only produced about 4 percent of world oil output.

[2] By including the errors and omissions in this measure of capital flows, I follow numerous studies in assuming that this primarily measures unrecorded private capital flight rather than other errors (Anthony and Hughes-Hallett (1992) is a useful survey of possible capital flight measures). Casual inspection of the data during 1981-1982, when capital flight was known to be extensive, support this assumption.

problems of August, 1982.

3. The micro model of investment.

This section presents a microeconomic investment model to organize the analysis, and the following section relates the exogenous variables to this model. I choose a baseline model which highlights the impact of relative price movements on investment partly because the data are available but also because adverse relative price movements provide the main alternative explanation for the investment decline. Investment data is available at the sector level, and hence the model is of a representative firm at this level. There is a neoclassical constant returns to scale production function, F(K,L), and a convex internal adjustment cost function, C(I), which measures adjustment costs in terms of the investment good. The firm is assumed to be a price-taker in product, factor and financial markets, and to know the values of future exogenous variables.[3]

The firm's problem is to choose investment and employment to maximize the present discounted value of future cash flows. Whenever possible, time and sector subscripts are suppressed.

(1) $$Max \int_0^{\infty} e^{-rs} \left[pF(K,L) - wL - p^I C(I) \right] ds$$

(2) $$s.t. \quad \dot{K} = I - \delta K$$

where r is the real interest rate, p is the product price, w is the wage rate, and p^I is the price of capital goods. The solution to this problem, obtained by maximizing the current valued Hamiltonian, includes the following four equations.

(3) $$p\, F_L(K,L) = w$$

[3] These assumptions are made to solve and motivate the investment model. The empirical section allows for a less-restrictive set of assumptions and other determinants of investment not in this model.

(4) $$p^I C_I(I) = q$$

(5) $$\dot{q} - (r+\delta)q = -p F_K(K,L)$$

(6) $$\lim_{S\to\infty} e^{-(r+\delta)s} q = 0$$

Equation (3) equates the marginal product of labor with the real product wage. Equation (4) states that investment is chosen up to the point where the marginal cost equals q, which represents the increment to the value of the firm from a unit change in investment. After integrating equation (5), q can be expressed as the present discounted value of future marginal value products of capital, discounted at the rate $r+\delta$. Note that higher wages depress investment demand by reducing L, from (3), which in turn reduces the marginal product of capital and therefore q, in equations (5) and (4).

To obtain a closed form investment equation one needs simplifying assumptions on the functional forms of C(.) and F(.). With these in hand, the solution procedure is to substitute optimal employment, L, from equation (3) into equation (5) and then integrate equation (5) forward from t to ∞ using (6), the no bubbles condition.

To provide an explicit investment function, I first assume a Cobb-Douglas production function, $F(K,L) = K^{\alpha} L^{1-\alpha}$. This assumption yields a simple and tractable expression for q:

(7) $$q = A \frac{p^{\theta} w^{1-\theta}}{r+\delta}$$

where $A = \theta^{(\theta-2)}(\theta-1)^{(1-\theta)}$ and $\theta = 1/\alpha > 1$.

Substituting (7) into (4), and assuming a quadratic investment cost function[4], $C(I) = I^2/2$, yields an investment function which is increasing in p, and decreasing in w, (because $\theta > 1$, and therefore $1-\theta < 0$), $r+\delta$, and p^I.

$$(8) \qquad I = A \frac{p^{\theta} w^{1-\theta}}{p^{I}(r+\delta)}$$

There is data on investment, product prices, and wages which varies across sectors and time; data on the price of investment goods and interest rates which varies across time only, and no data on depreciation. Therefore, I will estimate a version of equation (8) which is modified to accommodate the available data. That is, depreciation will be suppressed, and the constant, A, will be allowed to differ across sectors to pick up differences in technology, sector size, or any other sector specific but time invariant variable. Letting "j" denote sectors and "t" quarters, I will estimate an equation similar to the following:

$$(9) \qquad I_{jt} = A_j \frac{p_{jt}^{\alpha_2} \, w_{jt}^{\alpha_3}}{(p_t^I)^{\alpha_4} \, r_t^{\alpha_5}}$$

The key issue to discuss now is how exogenous variables such as the terms of trade and capital inflows, and a more general phenomena such as the debt crisis relate to equation (9). I will distinguish three possibilities which are not mutually exclusive. The first possibility is that the terms of trade decline caused the investment decline by affecting the prices on the right hand side of (9). The second possibility

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[4] From equation (4), a cost function with a positive second derivative will deliver the result that investment increases in q and decreases in p^I: the quadratic functional form is not essential for this. Including K or L in the investment cost function would make it difficult to obtain a closed form solution for investment.

is that the debt crisis caused the investment decline by affecting the prices on the right hand side of (9). The third possibility is that the debt crisis caused the investment decline by working through a variable that is not present on the right hand side of (9).

4. The mechanisms behind the terms of trade and debt effects.

This section will specify the channels through which I allow the debt crisis and the terms of trade decline to affect the investment equation (9) above. Briefly, the terms of trade and capital inflow effects are indirect. They work through the prices on the right of (9), using a demand and supply framework familiar from Dutch Disease models.[5] Other debt crisis effects such as the debt overhang affect investment more directly, and are tested by adding debt-crisis proxies to the right of (9). The rest of this section explains the reasoning in more detail.

There is first of all a direct and obvious relationship between the terms of trade and prices in export and import sectors. Because the terms of trade is measured as p^x/p^m, shocks to world export prices will induce a positive correlation between domestic export prices and the terms of trade, and shocks to import prices will induce a negative correlation.[6]

Apart from this direct relationship between the terms of trade variable and prices in traded sectors, a terms of trade improvement represents an increase in wealth which may stimulate demand and therefore affect product prices in non-traded sectors. This kind of effect is familiar from Dutch Disease models (for example, Neary and Van Wijnbergen, 1986) where a rise in the terms of trade raises spending on home goods and increases the relative price of non-traded goods. Capital flows are assumed to shift demand in a similar fashion. These assumptions lead to the following demand and supply equations for any given product market, indexed by the "j" subscript.

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[5] The model here is like an open economy model where the domestic interest rate is given by the world interest rate and therefore shifts to the savings function from exogenous changes in capital inflows do not have a direct effect on investment, but may have an indirect effect through prices. Although the basic model here does not allow capital inflows to directly affect investment, I test for this possibility in the empirical section.

[6] The terms of trade index was computed by the Bank of Mexico using international (dollar) prices of Mexico's main imports and exports. These prices are distinct from the sectoral value added prices, p_j, also used in this paper.

(10) $$p_j = d(y_j , \frac{p^x}{p^m} , CF)$$

(11) $$p_j = s(y_j , w_j)$$

In equations (10) and (11), p is the product price, y is output, p^x/p^m is the terms of trade, CF is the capital flow variable and w is the wage. The sectoral wage in turn is determined in the simplest possible neoclassical labor market, described by equations (12) and (13) below. Labor demand is an implicit function of the product price and the wage.

(12) $$w_j = d(p_j , L_j)$$

And labor supply is an implicit function of the consumer price index and the wage.

(13) $$w_j = s(CPI , L_j)$$

Equations (10) to (13) can be solved to obtain reduced form equations relating prices and wages to the terms of trade, the capital flow variable, and the CPI.

(14) $$p_j = g(\frac{p^x}{p^m} , CF , CPI)$$

(15) $$w_j = h(\frac{p^x}{p^m} , CF , CPI)$$

The important point for this paper is just to establish that such reduced forms exist, in order to motivate regressions of prices and wages on the terms of trade and capital flows. A possibly confusing point is that the estimated regressions have p_j/CPI and w_j/CPI on the left rather than p_j and w_j as in equations (14) and (15), implicitly assuming that the functions are homogenous with respect to the CPI. Furthermore, because it happens not to matter for the main points, the reported regressions use weighted average product prices and wages, $\Sigma\omega_j p_j/CPI$ and $\Sigma\omega_j w_j/CPI$, on the left, where the ω_j are investment shares. If reduced forms exist for sectoral prices, they also exist for functions of sectoral prices such as these price indexes. I do arbitrarily assume a log-linear functional form.

The expected sign of $\partial(p_j/CPI)/\partial(p^x/p^m)$ depends on the nature of the sector. If p_j is the price of a non-traded product, a decline in p^x, holding p^m constant, should depress demand and non-traded prices. Given that the market basket of the CPI has a high non-traded component, both numerator and denominator of p_j/CPI should be affected similarly, and thus a regression of p_j/CPI on p^x/p^m should yield a coefficient that is close to zero.

If p_j is the price of imported machinery, and the price of oil exports falls, the denominator should be depressed but not the numerator, yielding a negative coefficient. If p_j is the product price of a non-oil export sector, and the price of oil exports falls, the same thing should happen. Of course, if p_j is oil, both numerator and denominator should be depressed, yielding an ambiguous but probably small coefficient. Since the capital flow variable is also modelled as a demand shifter, the same kind of reasoning also applies for its effects on p_j/CPI.

This section now turns to a brief discussion of the debt theories. It is important to remember that the main triggering mechanism for these theories is the *perception* that the country is not solvent rather than simply the level of debt. The theories argue that this shift in sentiment lead to several other factors which directly depressed investment. Therefore, this paper considers proxies for Mexico's perceived creditworthiness by the international financial community to test these theories.[7]

Krugman (1988) and Sachs (1988) advanced the idea that the debt overhang can account for the investment decline. Following the terminology in Krugman (1988), a debt-overhang is said to exist when the expected present value of future resource transfers is less than the face value of the external debt. The argument presumes that a debt-overhang creates a situation where creditors can siphon off some of the additional output resulting from investment. In this situation a social planner would invest less due to the implicit tax levied by foreign creditors. This is the formal mechanism linking high debt to low investment in the models of Sachs (1988), Krugman (1988), Froot (1988), and Bulow and Rogoff (1989), although the last two papers do not necessarily advocate the debt-overhang view.

A related argument is that the overhang caused the termination in lending by foreign commercial banks. In Sachs (1988), the passage of a country from solvency to a debt-overhang places indebted countries in a situation analogous to a domestic insolvent firm. Lending is restricted essentially because semi-insolvency exacerbates creditor-debtor agency problems.

Krugman (1988) and Helpman (1988) also argue that a debt overhang causes investors to fear higher investment taxes. Ize (1989) and Rodrik (1989) stress that the debt crisis introduced unprecedented policy uncertainty. Dixit (1989), and Rodrik (1989), following ideas in Bernanke (1983) and Cukierman (1980) argue that even in the absence of risk aversion, it may be optimal to postpone investments in the face of greater uncertainty, because the decision may be irreversible, and uncertainty may resolve itself with the passage of time.

The evidence suggests that there was an important shift in perceptions of Mexico's solvency in the late Summer of 1982. Solis and Zedillo (1985) report that Mexico's solvency was first questioned during negotiations for a 2.5 billion dollar "jumbo" loan to the Mexican government in June 1982. The

[7] Fry (1989) and Cohen (1990) test specifications with the debt stock on the right; Savvides (1990) also argues against such practice. In this paper, the debt stock is used in annual regressions, but not in the quarterly regressions since the data are not readily available.

issue of the Economist magazine published just after the August incident reports that creditors were still lending heavily to Mexico in the spring of 1982. Earlier issues of the Economist in 1982 fail to mention Mexico's impending payments problems. Furthermore, the price of a Mexican government bond, and the price of the "Mexico Fund" stock, both of which were traded on the New York Stock Exchange at this time, did not exhibit any unusual decline until the week of the August announcement, suggesting that Mexico's problems were not anticipated by the international financial community. Contemporary accounts such as Kraft (1985) attest to the surprise caused by the August announcement.

5.Data and Econometric issues.

The investment data analyzed here is a sub-sample from a larger data set developed from a firm-level investment survey conducted by the Bank of Mexico between 1981 and 1985. This larger data set was published in the Bank of Mexico's monthly publication Indicadores Economicos in more aggregated form (9 sectors rather than 68) during 1987 and 1988. The more disaggregated data used here was obtained from the internal files of the Bank of Mexico during a personal visit by the author. This data set is not well known outside of Mexico and has not yet been examined at this level of disaggregation in print. The key features of the data set are as follows.

* Real investment spending: constant 1970 pesos.

* 4 kinds of investment goods: transport equipment, machinery and operating equipment, buildings and structures, and office furniture and equipment.

* 68 sectors, mostly mining and manufacturing.

* 20 quarters: 1981:1 to 1985:4.

* Coverage includes 56,053 public and private firms; does not include "maquiladora" or "in-bond" firms operating in tariff-free export enclaves; does not include Agriculture, Forestry or Fishing.

The sub-sample I analyze excludes sectors in which public enterprises are dominant, and restricts attention to machinery investment. This selection permits a focus on private sector behavior, and permits a focus on a relatively homogenous investment good.[8] All sectors with more than 25 percent of output produced by public enterprises in 1980 were eliminated, reducing the number of sectors in the sample from 68 to 48. Another 6 sectors were eliminated for lack of price data, leaving 42 sectors in the sample. This final sample represents 61 percent of all private investment in the sample and 21 percent of public and private investment.

Turning back briefly to the full data set, investment declined in virtually all (65 of 68) of the sectors between 1981 and 1985, and typically was quite severe. Simple correlations do not reveal any statistically significant association between the investment decline and ownership status (public/private); nor any significant association between the investment decline and import or export shares. The only significant simple association I found is that sectors with high machinery shares in investment in 1981 also tended to experience more severe investment declines after 1981.

The other key variables are listed and described briefly in table 1. The price indexes measure the price for value added, and the wage indexes measure the mean cost of a man-hour of labor in the sector. The interest rate is the three-month government bond rate (CETES in Mexico) minus contemporaneous CPI inflation. Many other measures of real interest rates were tried in the regressions but not reported in table 1 to save space. MEXB is the ratio of the price of a Mexican government bond to a risk-free bond with the same coupon and maturity.[9] MEXF is the stock price of the "Mexico Fund" mutual fund, traded on the New York Stock Exchange. MEXCW is *Institutional Investor's* index of Mexico's perceived creditworthiness by major U.S. banks (a higher value means the country is more

[8] Machinery investment is by far the largest spending category in this data set (about 75 percent of the total). Earlier versions of this paper included analysis of separate investment equations for machinery investment and all other investment. The output was much more complex but the main conclusions were similar.

[9] The risk-free bond price was calculated by the author as the present discounted value (using the average interest rate on 10-year U.S. government bonds for a given quarter) of the Mexican bond's payment stream (the coupon was 8.125 percent and the bond matured in December 1997). The Mexican bond price was obtained from Standard and Poors.

creditworthy).[10]

The simple movements in the data are as follows. Real product prices do not change substantially during the 1981 to 1985 period; however real wages fall by about 30 percent on average; and the real price of machinery rises by more than 30 percent. Real domestic interest rates decline during the high inflation quarters around 1982 but rise back towards zero by the end of the sample.[11] The three debt crisis proxies, MEXB, MEXF. and MEXCW, all are fairly flat before the Summer of 1982, and then plunge precipitously around August 1982. After 1982, MEXB rises steadily up to the end of the sample in 1985, while the other two variables remain depressed throughout the period.

The equations to be estimated are log linear versions of the investment equation, (9), and the reduced form price and wage equations, (14) and (15). Recall that product prices, p, machinery prices, p^I, and wages, w, are all scaled by the CPI.

(16) $$\ln(I)_{jt} = \alpha_{0j} + \alpha_1 D_t + \alpha_2 \ln(p)_{jt} + \alpha_3 \ln(w)_{jt} + \alpha_4 \ln(p^I)_t + \alpha_5 r_t + \epsilon^1_{jt}$$

(17) $$\ln(pbar)_t = \phi_0 + \phi_1 \ln\left(\frac{p^x}{p^m}\right)_t + \phi_2 CF_t + \epsilon^2_t$$

[10] *Institutional Investor* asks about 90 banks to grade countries on a 0 to 100 scale, with 100 representing the lowest chance of default, and then weights the responses by size of exposure and analytical sophistication of the bank's country analysis system. These ratings are published twice every year, and linear interpolation was used to obtain quarterly numbers.

[11] Two other measures of expected inflation: one using fitted values from an AR(4) equation; the other using the average of two leads of inflation, yielded similar data on real interest rates. It is difficult to argue that negative real interest rates during this period reflect government controls on nominal interest rates because a significant fraction of government bonds were sold on the open market to private investors.

$$\text{(18)} \qquad \ln(wbar)_t = \theta_0 + \theta_1 \ln(\frac{p^x}{p^m})_t + \theta_2 CF_t + \epsilon^3_t$$

$$\text{(19)} \qquad \ln(p^I)_t = \beta_0 + \beta_1 \ln(\frac{p^x}{p^m})_t + \beta_2 CF_t + \epsilon^4_t$$

Note that there is a separate equation, (19), for machinery prices and that (17) and (18) have the averages of p_{jt} and w_{jt} across sectors on the left rather than the actual p_{jt} and w_{jt} (these are weighted averages using investment shares for weights). This simplifies the presentation. Both (17) and (18) were estimated sector by sector, but nothing essential in the argument is lost by reporting results from the simpler framework above. Note also that D_t in (16) stands for any of the four debt-crisis proxies, and that quarterly dummies were included in the estimation of (16) but not shown above.

Equations (16) through (19) make explicit that the effect of the terms of trade on investment is indirect, operating through product prices, wages and the machinery price. The debt crisis is allowed to affect investment in two ways. First, the capital flow variable affects investment indirectly by affecting the relative prices. Second, debt-overhang and/or uncertainty are allowed to affect investment directly in equation (16).

The model underlying equations (16) through (19) treats the terms of trade, capital flows and the domestic interest rate as exogenous, and has a recursive structure. Although the recursive nature of the model may be used to defend least squares estimation of the investment equation, there are also good reasons to doubt whether this is the best approach. There could be standard supply and demand simultaneity between investment and either the machinery price or the domestic interest rate. There may also be a relationship between an unobserved variable in the investment equation and wages. For example, the euphoria surrounding the oil boom in Mexico may have been associated with both an extra stimulus to investment and wage bonuses or other implicit rent sharing arrangements with labor.

I will use three instruments in an attempt to deal with this issue: the terms of trade, the capital flow variable, and the LIBOR interest rate. The first two instruments are clearly suggested by the model above. It also seemed natural to include an international interest rate to instrument for a domestic interest rate.[12] With three instruments, the estimates of (16) treating three variables as endogenous, namely the machinery price, wages and the interest rate, are exactly identified.

The reported regressions in table 2 have an error structure that was determined through some preliminary examination of the residuals. First, a Bartlett test overwhelmingly rejected the hypothesis that the error variances were equal for each sector. Second, separate Durbin-Watson statistics computed for each of the 42 sectors were either close to 2 or were in the inconclusive range. Somewhat surprisingly, only 3 of the 42 Durbin-Watson statistics provided evidence for positive serial correlation (the regressions in table 2 report the average Durbin-Watson statistic across all sectors). Third, the sample correlations over time of the residuals in all 42*41/2 pairs of sectors were examined and only about 5 percent were even above 0.45 in absolute value. In sum, there was strong evidence for heteroscedasticity but not very strong evidence for other departures from a diagonal error structure: hence weighted least squares estimates will be reported below.

6. Results.

Table 2 presents instrumental variables estimates of the investment equation (16). The dummy variable D_t is a crude proxy to catch debt-crisis effects; it is coded to equal one after the second quarter of 1982, and therefore should have a negative sign. MEXB measures the creditworthiness of the Mexican government as perceived by the international financial community, and should have a positive sign.

[12]Several forms of the interest parity relationship imply that international interest rates can be treated as instruments for domestic interest rates.

MEXF is an index of stock prices for Mexican companies and should also carry a positive sign. And MEXCW is an index of creditworthiness for Mexico as a whole, and should again have a positive sign. All of these are interpreted as imperfect, but still informative, indicators of debt-overhang and/or uncertainty.

Of these four debt variables, only one (the dummy variable D_t) is significant and has the negative sign predicted by the debt theories, while the other three are insignificant, and among these, the coefficient on MEXB has the wrong sign. These results do not support either a complete rejection or acceptance of the various debt hypotheses, but on balance cast doubt on their importance.

It is worth noting four additional points about the debt variables. First, the debt dummy is arguably the most crude way to measure debt overhang effects, and yet it is the only one which shows significant debt effects. Second, although the crudeness of the variable is an issue, in defence of the debt theories, the estimated effect is large. The coefficient of -.83 indicates that ceteris paribus, this variable can account for 70 percent (-.83/-1.18) of the investment decline in the sample.[13] Third, fear of higher investment taxes to solve government solvency problems is one of the main mechanisms offered to explain the precise transmission from debt problems to investment. Yet, the most precise indicator of perceived solvency of the Mexican government, MEXB, is also the worst performer of all the debt variables. Fourth, MEXCW is arguably the best measure to capture international credit rationing effects since it comes from direct surveys of country risk perceptions by major international banks, but it is not significant either.

To check further the significance of the dummy variable, the investment sample was restricted to the eight largest exporting sectors (sectors which sold more than 10 percent of their output outside Mexico in 1980). One version of the debt-overhang hypothesis in Sachs (1988) states that investment fell

[13] Note however that three-stage least squares estimates of the same equation produced a somewhat smaller coefficient of -0.63 (0.43).

because exporters feared expropriation of their output by foreign creditors. While it is unclear whether this effect can have a large impact on total investment in a country which exported at most 20 percent of output, it may still be expected to have a larger effect on sectors that export than those that do not. However, when the model in column 2 of table 2 was re-estimated on these eight sectors, the debt-overhang effect as measured by this dummy was actually smaller (-0.425, se=0.784).[14]

While the results in table 2 cast some doubt on the importance of debt crisis effects stressed in the literature, they also point to a major effect that has not been emphasized. The most important result, both in terms of size, statistical significance, and robustness across specifications, is the large estimated machinery price elasticity, which ranges from -1.68 to -4.75.[15] Since the relative price of machinery rose by about 40 percent over the sample period, this is an important microeconomic channel behind the investment decline, perhaps the single most important channel.

Another result in table 2 that seems robust across specifications is the positive elasticity on the product price variable of about 1.0, although sometimes this is not significant. It should be mentioned that the regression is controlling for changes in the prices of intermediate inputs through this variable since the prices are value added prices.[16]

It is hard to draw reliable conclusions about the remaining two variables: wages and real interest

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[14] The other estimated coefficients, on p, w, p^I, and r, were 1.52 (1.66), -2.86 (5.14), -6.00 (3.74), and -0.013 (0.010).

[15] The low value of -1.68 comes from the regression where the debt crisis proxy, ln(MEXB), is statistically insignificant and has the wrong sign. Of the regressions with correctly signed debt crisis proxies, the range is -2.58 to -4.75. One reason that the regression with MEXB differs from the other regressions is that MEXB is not highly collinear with the other debt crisis proxies. It measures market sentiment about the Mexican government's creditworthiness rather than that of the entire country. This variable rose during 1984-1985, whereas the other debt crisis proxies remained depressed.

[16] On the issue of whether to treat the price variable as endogenous, I found that the residuals from the price regression (equation 17 with p_{jt} on the left) had virtually zero correlation with investment or the residuals from the investment equation, suggesting that endogeneity is not an issue. Regressions that nevertheless treat the price variable as endogenous yield large negative price coefficients with extremely high standard errors.

rates. The wage variable switches signs across specifications and is typically not significant. It is only significant once MEXB is included in the regression, but MEXB itself has the wrong sign and is not significant.

The estimated real interest rate coefficients range from about zero to -0.0045. The -0.0045 estimate means that a percentage point increase in real interest rates would reduce the log of investment by 0.0045, and thus would reduce investment by 0.45 percent. This effect seems fairly small: if real interest rates rose by 20 percentage points, the -0.0045 estimate predicts that investment would decline by only 9.4 percent. While there are reasonable objections to the simple measure of real interest rates used in this regression, alternative measures yielded smaller estimated effects.[17]

The estimates in table 2 also facilitate a more precise quantitative assessment of the impacts of the right-hand-side variables on the investment decline. Two of the right hand side variables, real product prices and real interest rates, did not change enough between 1981 and 1985 to have been major players in explaining the investment decline, whatever their estimated coefficients. Of the other variables, real machinery prices rose by about 30 percent and real wages fell by about 30 percent. The wage effect is not reliably estimated and thus will not be stressed. In contrast, the machinery price effect seems reliable and important. Taking the smallest estimated coefficient from table 2 of -1.68, the observed rise in machinery prices can explain 46 percent (-1.68*0.324/-1.18) of the investment decline; taking the largest estimated coefficient, it can explain 130 percent. The evidence therefore marks out machinery prices as an important channel of transmission to investment.

Table 3 presents the estimates of equations (16) - (19). The estimates of the product price equation (16) offer no evidence that the terms of trade decline or the capital flow reversal affected real

[17] A proxy for expected inflation was calculated using one-step-ahead forecasts from an AR(4) time series regression: the estimated coefficient was -0.0018 (0.0007). A proxy for the return on holding U.S. bonds was also constructed using data on the 3-month futures premium for the Mexican Peso (an indicator of expected devaluation), and U.S. 3-month treasury bill rates: the estimated coefficient was -0.0029 (0.0012).

product prices. On the other hand, there is evidence that the terms of trade reduction depressed real wages. The absence of any effect on product prices probably indicates that there is little difference between the traded goods content of the product price indexes in the numerator, and the CPI in the denominator. In 1980, the sectors covered by this data exported only about 6 percent of their output on average.

Table 3 provides strong evidence that the terms of trade decline served to increase the relative price of machinery and somewhat weaker evidence that the capital flow reversal had a similar effect. While Mexico sold only a small fraction of its non-oil output abroad during this period, at least 50 percent of machinery investment in Mexico was imported. Mexico was a price-taker in the world market for traded machinery. Therefore, a demand contraction caused by the oil price decline could be expected to reduce the CPI, with its high non-traded content, relative to the price of machinery, and yield a negative relationship between p^x/p^m and p^I/CPI. Note that in the machinery price equation, the coefficients on both variables are negative, in line with this reasoning. The terms of trade coefficient is easily significant, and the capital flow coefficient is marginally significant. In other specifications which extended the sample size and tried other slightly different measures of capital flows, the terms of trade was always significant, while the capital flow variable was sometimes insignificant. The evidence strongly suggests that the terms of trade decline played an important role in explaining the rise in the relative price of machinery.

The estimated coefficients in table 3 can also be used to split the increase in machinery prices into the part attributable to the terms of trade and capital flows. Multiplying the estimated coefficients with the actual changes in the right had side variables, it turns out that the change in the terms of trade accounts for 67 percent 100*(-0.836)(-0.302)/(0.379) of the machinery price increase (the denominator is the change in the fitted value of the dependent variable), while the capital flow reduction accounts for the remaining third.

The model so far has allowed capital flows to affect investment only indirectly; that is, through their effect on prices. Alternatively, a reduction in foreign capital inflows may shift the domestic saving function to the left and cause a simultaneous rise in domestic interest rates and a reduction in investment. In such a model capital flows would have a direct effect on investment even after controlling for other relative price movements. However, adding the capital flow variable to the estimated investment function yields a small and insignificant coefficient, 0.0025 (0.0178). Thus the data do not support the view that the capital flow reduction directly depressed investment after controlling for the effect of relative price movements.[18]

7. Evidence with Annual Investment Data.

To assess the generality of the results both across time and for larger investment aggregates, this section examines regressions using total investment in Mexico over a longer time span (1970-1988). The estimated equations, reported in table 4, are reduced forms of the model outlined above: investment is regressed on the terms of trade, capital inflows, an external interest rate, and other variables to capture debt problems. The real investment data used as the dependent variable are scaled by population to control for trend growth. It turns out that scaling by GDP delivers similar results.

The debt crisis variables in the regressions are the ratio of debt to GDP, and a dummy variable taking the value one after 1981. The regressions use government consumption spending as an instrument for the debt variable. The reason is to use the part of the variation in the debt variable that was driven by government consumption spending rather than investment spending, because the latter may be spuriously related with investment. The table shows that this part of the variation in the debt variable is positively associated with investment after controlling for the other exogenous variables. This evidence

[18] This can be seen as a test for what Borensztein (1990) calls the credit rationing effect. Note also that this effect predicts that domestic real interest rates should have been higher after the debt crisis than before. The Mexican real interest rates used in this paper, which cover the 1981-1985 period, are not clearly higher after 1982:3 than before.

therefore does not support the simple notion that accumulated debt represents an investment deterrent. The table also shows that the simple debt dummy either is not significant (column 1) or has the wrong sign (column 5).[19] Combining these results with the above results using the quarterly investment data, it seems that the only debt indicator which provides evidence for debt-overhang effects is the debt dummy in the quarterly regressions. On balance the evidence for this kind of debt effect is not strong.

The evidence in table 4 for the other kind of debt crisis effect, a demand compression due to the reversal in capital flows, is somewhat more supportive but also mixed. This variable is always positively signed as anticipated, but only significant when other incorrectly signed debt or interest rate variables are included in the regression. In column 4, when the terms of trade and the capital flow variable are alone in the regression, the terms of trade variable is significant while capital flow variable is not.

In contrast, the estimated terms of trade effect is significant in table 4, regardless of the other variables controlled for in the regression. To gauge the size of the estimated effect, between 1981, when investment in Mexico was at its highest, and 1988, when it was at the lowest level in the recent past, the log of the investment variable changed by -0.725. During the same period, the log of the terms of trade index changed by -0.740. Using the estimated coefficient of 0.742, the terms of trade effect by itself can account for about 75 percent (-0.742*0.740/-0.725) of the investment decline between 1981 and 1988. Hence this evidence from annual data supports the earlier evidence on the importance of the terms of trade effect.

8. Conclusions and discussion.

This paper has developed and estimated an investment model which distinguishes three ways in which the debt crisis and Mexico's terms of trade decline could have affected investment in Mexico. The model allows the capital flow reversal and the terms of trade reduction to affect aggregate demand and

[19] Coding the debt dummy to equal 1.0 after 1982, rather than 1981, yields an insignificant coefficient on D in the regression in column 5 (0.067, se=0.182), a significant coefficient on the terms of trade (0.800, se=0.284) and an insignificant coefficient on the capital flow variable (0.007, se=0.011).

relative prices, and ultimately to affect investment through these prices. The model also allows debt overhang effects or uncertainty effects to depress investment directly.

One of the main findings from this analysis is that only one of several specifications provide evidence for debt overhang or uncertainty effects. Overall, there is not robust evidence that this was the main reason for Mexico's large investment decline in the "lost decade" of the 1980s.

The evidence instead supports two main points that have been underemphasized in the debt literature. First, the main proximate cause of the investment decline was the rise in the relative price of machinery between 1981 and 1985. This variable is the most reliable across specifications in accounting for the investment decline. The argument to explain this rise is based on the fact that machinery is essentially a traded good in Mexico. As spending declined in response to the terms of trade decline or the capital flow reversal, this demand contraction reduced other product prices relative to this price, depressing investment demand.

Second, the decline in Mexico's international terms of trade during this period, driven by falling world oil prices, is probably the most important ultimate cause of this increase in relative machinery prices, but the reversal in net capital inflows to Mexico may also have played an important role. The econometric evidence using quarterly data during the 1981-1985 period indicates that both the terms of trade reduction and the capital flow reversal played a role in increasing this relative price. Calculations using the estimated coefficients and the actual changes in these two variables between 1981 and 1985 suggest that about two-thirds of the machinery price increase can be attributed to the terms of trade decline, and the other third to the capital flow reversal. But in reduced form regressions using annual data over a longer time span, it is unclear whether the capital flow variable is significant.

Finally, it is also worth mentioning that investment in two neighboring economies which were also riding the oil boom of 1973-1981, namely Texas and Louisiana, also fell during the 1981-1986 period, and that adverse commodity price shocks also affected many other heavily indebted countries.[20] Therefore, at the very least, the direct role of commodity price shocks such as Mexico's oil price decline in causing low investment levels in the 1980s has been insufficiently emphasized in the literature on the effects of the international debt crisis.

[20] These facts are from Warner (1992).

Table 1

DATA

Variable	Mean	Description	Source
I_{jt}	47.45	Real Machinery Investment	*Bank of Mexico*
$p_{jt} = p_{jt}/CPI_t$	62.94	Value Added Price Index	*Indicadores Economicos*
$w_{jt} = w_{jt}/CPI_t$	72.25	Real Wage Index	*Indicadores Economicos*
$p^I_t = P^I_t/CPI_t$	3.71	Price Index for Machinery	*Indicadores Economicos*
CF_t	0.34	Net Capital Inflows	*Indicadores Economicos*
r_t	-10.79	Real Interest Rate	*Indicadores Economicos*
$LIBOR_t$	11.84	Nominal LIBOR Interest Rate	*DRI*
p^x_t/p^m_t	78.87	Terms of Trade Index	*Bank of Mexico*
D_t	0.35	Dummy Variable Indicating Debt Crisis (=1 if t>82:3)	-
$MEXB_t$	81.35	Price of a Mexican Government Bond	*New York Stock Exchange*
$MEXF_t$	4.35	Price of Mexico Fund	*New York Stock Exchange*
$MEXCW_t$	47.29	Index of Mexico's Creditworthiness	*Institutional Investor*

The j index ranges across sectors: for the investment sub-sample in the regressions, j=1,..,42; for prices and wages j=1,..,9. The matching scheme, reported in the appendix, is not one-for-one.
The time index is quarterly, t= 1981:1,..,1985:4.
MEXCW is published bi-annually; quarterly data was obtained by linear interpolation.
Other measures of the real domestic interest rate, r, were used in the regressions but not reported above.
The index numbers were not scaled to a common base year because the relevant regressions were estimated in logs.

Table 2

Instrumental Variables Estimates of Equation (16)

Dependent Variable: ln of Real Investment, $\ln(I_{jt})$

Independent Variable	Estimated Coefficients (Standard Errors)				
$Ln(p)_{jt}$	1.01 (0.53)	1.90 (0.83)	0.60 (0.46)	0.78 (0.41)	1.14 (0.41)
$Ln(w)_{jt}$	0.63 (1.21)	-3.20 (2.66)	2.13 (0.72)	1.00 (0.86)	-0.01 (0.76)
$Ln(p^I)_t$	-3.20 (1.30)	-4.75 (1.85)	-1.68 (0.78)	-2.58 (0.79)	-3.18 (1.62)
r_t	-.0037 (.0027)	-.0102 (.0048)	.0008 (.0026)	-.0030 (.0019)	-.0045 (.0014)
D_t	-	-0.83 (0.38)	-	-	-
$Ln(MEXB)_t$	-	-	-0.43 (0.30)	-	-
$Ln(MEXF)_t$	-	-	-	0.08 (0.11)	-
$Ln(MEXCW)_t$	-	-	-	-	0.38 (1.05)
R^2	0.50	0.37	0.51	0.51	0.49
SE	1.02	1.07	1.00	1.01	1.02
DW	1.63	1.58	1.67	1.64	1.62
N-K	790	790	790	790	790

The instruments are the log of the terms of trade, the capital inflow variable, and the LIBOR interest rate. The endogenous variables are the wage, the price of machinery and the domestic real interest rate. The error structure allows for sector-specific error variances, estimated in a first-stage regression. This table does not report the separate intercepts estimated for each sector nor the coefficients on quarterly dummies.

Table 3

OLS Estimates of Equations (17) to (19)

(Robust Standard Errors in Parentheses)

Independent Variables	Dependent Variables		
	$Ln(pbar)_t$	$Ln(wbar)_t$	$Ln(p^l)_t$
p^x_t/p^m_t	-0.051	1.057*	-0.836*
	(0.163)	(0.339)	(0.265)
CF_t	0.002	0.007	-0.026
	(0.007)	(0.018)	(0.014)
R^2	0.040	0.642	0.734

The reported standard errors are robust to quite general forms of serial correlation and heteroscedasticity. They follow Wooldridge (1989), which proposes a computationally simple procedure. The sample for all regressions is quarterly, 1981:1 to 1985:4. Statistical significance at the 5 percent level is indicated by a * next to the estimated coefficient.

Table 4

Estimates of the Reduced Form using Annual Data and Total Investment

Dependent Variable: ln of Real Per-Capita Investment, $\ln(I_t)$

Independent Variable	Estimated Coefficients (Standard Errors)				
$\ln(p^x_t/p^m_t)$	0.624	0.742	0.621	0.742	0.956
	(0.300)	(0.202)	(0.207)	(0.229)	(0.211)
CF_t	0.024	0.031	0.025	0.004	0.042
	(0.017)	(0.010)	(0.010)	(0.007)	(0.015)
r^{US}_t	0.047	0.031	0.053	-	-
	(0.038)	(0.022)	(0.022)		
$\ln(DEBT/GDP)_t$	0.217	0.220	-	-	-
	(0.108)	(0.951)			
D_t	-0.202	-	-	-	0.580
	(0.439)				(0.218)
R^2	0.673	0.691	0.620	0.503	0.640
SE	0.130	0.126	0.139	0.158	0.135
DW	2.090	2.126	0.878	0.743	1.215
N-K	11	12	15	16	15

The terms of trade and capital flow variables are annual version of the quarterly variables used earlier in this paper. Of the other new variables, r^{US}_t is the U.S. 10 year t-bond rate, DEBT/GDP is Mexico's total debt in dollars, multiplied by the average peso/dollar exchange rate, and divided by nominal Mexican GDP (source: *World Debt Tables*, World Bank, and *Indicadores Economicos*, Bank of Mexico). D_t is a dummy equal to one after (and including) 1982. The regressions in the first two columns use current and lagged government consumption expenditures as an instrument for the DEBT/GDP variable; the other regressions are OLS. The sample is 1970-1988 except when the debt variable is used, in which case it is 1972-1988.

References

Anthony, M. and Hughes-Hallett, A. (1992) "How Successfully Do We Measure Capital Flight?", The Journal of Development Studies, 28, 538-556.

Borensztein, E., (1990) "Debt Overhang, Credit Rationing, and Investment", Journal of Development Economics, 32, 315-335.

Bernanke, Ben S., (1983) "Irreversibility, uncertainty, and cyclical investment", Quarterly Journal of Economics, 98, 85-106.

Buffie, E. F., (1990) "Economic Policy and Foreign Debt in Mexico," in Developing Country Debt and Economic Performance, Vol. 2: Country Studies, ed. by Jeffrey Sachs (University of Chicago Press, 1990)

Bulow, J. and Rogoff, K. (1991) "Sovereign Debt Repurchases: No Cure for Overhang," Quarterly Journal of Economics, 106, 1219-1234.

Cohen, D., (1990) "Slow Growth and Large LDC Debt in the Eighties: an update." mimeo, CEPREMAP, October.

Cukierman, Alex, (1980) "The effects of uncertainty on investment under risk neutrality with endogenous information" Journal of Political Economy, 88.

Dixit, A. (1989) "Intersectoral capital reallocation under price uncertainty", Journal of International Economics, 26, 309-325.

Dornbusch, R., (1988) "Mexico: Stabilization, Debt and Growth," Economic Policy, 3, 233-283.

Faini, R., and de Melo, J., (1990) "Adjustment, Investment and the Real Exchange Rate in Developing Countries", Economic Policy, 11, 492-512.

Froot, K. (1989) "Buybacks, Exit Bonds, and the Optimality of Debt and Liquidity Relief", International Economic Review, 30, 49-70.

Fry, M., (1989) "Foreign Debt Instability: an analysis of national Saving and domestic investment responses to foreign debt accumulation in 28 developing countries.", Journal of International Money and Finance, 8, 315-344.

Hayashi, F. (1982) "Tobin's Marginal q and Average q: A Neoclassical Interpretation", Econometrica, 50, 213-224.

Helpman, E. (1989) "Voluntary Debt Reduction: Incentives and Welfare", Staff Papers, International Monetary Fund, 36, 580-611.

Hofman, B., and Reisen, H., (1990) "Debt Overhang, Liquidity Constraints, and Adjustment Incentives", Technical Paper No. 32, OECD Development Centre, October.

Ize, A., (1988) "Savings, Investment and Growth in Mexico: Five years after the crisis", mimeo, IMF Fiscal Affairs Department, December.

Kraft, J. (1985) "The Mexican rescue", New York, Group of Thirty.

Krugman, P. (1985) "International Debt Strategies in an Uncertain World," in Smith and Cuddington, eds., International Debt and the Developing Countries, World Bank.

_________, (1988) "Financing vs Forgiving a Debt Overhang", Journal of Development Economics, 29, 253-268.

Neary, J. P., and van Wijnbergen, S., eds., (1986) "Natural Resources and the macroeconomy.", Cambridge, MA, MIT Press.

Rodrik, D., (1991) "Policy Uncertainty and Private Investment in Developing Countries", Journal of Development Economics, 36, 229-242.

Sachs, J., (1988) "The Debt Overhang of Developing Countries," in Ronald Findlay, ed., Debt, Growth and Stabilization: Essays in Memory of Carlos Diaz Alejandro, Oxford, Blackwell.

Savvides, A., (1992) "Investment Slowdown in Developing Countries During the 1980s: Debt Overhang or Foreign Capital Inflows?", Kyklos, 3.

Solis, L., and Zedillo, E., (1985) "The Foreign Debt of Mexico" in G. W. Smith and J. T. Cuddington International Debt and the Developing Countries, World Bank.

Warner, A., (1991) "The Debt Crisis, World Investment Cycles, and American Exports", PhD Dissertation, Harvard University, May.

_________, (1992) "Did the Debt Crisis Cause the Investment Crisis?", Quarterly Journal of Economics, 107, 1161-1186.

Wooldridge, J., (1990) "Regression-based inference in linear time series models with incomplete dynamics", MIT working paper No. 550, 1-53, April.

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