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Birth of a Bill Market

by

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August 1970

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The University of Michigan
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Discussion Paper No. 11

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I. Introduction

Probably in no area of the economic development literature have more half-truths been promulgated than concerning the money and capital markets of developing countries. Despite nearly a quarter-century of extensive empirical, historical and institutional research into the development process, the literature has been slow to free itself from rigid generalizations about the backwardness of the less developed countries' financial systems and about the need, as a precondition of growth, for a rapid and stylized expansion of the financial infra-structure.

One half-truth has, however, proved more durable, namely that governments of underdeveloped countries face a long and difficult task if they attempt to create short-term credit-instrument (or more briefly, bill) markets. A few examples display the tenacity of this belief:

> In certain underdeveloped countries...the central bank...has already contributed substantially to the growth of a [government securities] market. In general, however, relatively little if anything has been accomplished in this respect, and the process will inevitably be slow.[1]

> The development of broad and flexible money markets, as recent experience shows, is a slow and often difficult process.[2]

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[1]A. I. Bloomfield, "Monetary Policy in Underdeveloped Countries", in C. J. Friedrich and S. E. Harris (eds.), Public Policy, Harvard University Press, 1956, p. 267.

[2]P. G. Fousek, Foreign Central Banking: The Instruments of Monetary Policy, Federal Reserve Bank of New York, Nov. 1957, p. 100.

> Experience in New York, where the Federal Reserve System took
> special steps to encourage the growth of a bill market in the
> nineteen-twenties, showed that even in a highly developed and
> very large economic community, these markets do not grow at
> all easily.[1]

> One might as well accept the fact that the more backward
> countries will possess neither a significant money market nor
> substantial bank deposits for a long time to come.[2]

> Attempts have been made by many central banks in developing
> countries to establish a market for these [government] securi-
> ties but with hardly any success.[3]

None of these statements are wrong, especially if they are read carefully and if

words like "broad" and "substantial" are generously interpreted. But the in-

evitable sum of a series of such expert pronouncements is the belief that the

establishment of a bill market in an underdeveloped country is not easy.

The purpose of this paper is to present a startling bit of counterevidence

(in Sections II and III) and to suggest a more appropriate generalization ab-

out bill markets in developing countries (in Section IV).

The counterevidence, in short, is as follows. Although the stock exchanges --

and hence a potential marketplace for private and government securities -- have

existed in Colombia for more than forty years, the securities market has remained

"very limited".[4] Thus, it was not surprising that, when the government altered

its export stimulation scheme in 1967, the fact that the new system involved

the issue of negotiable government (one-year) bills was considered unimportant by

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[1] R. S. Sayers, "Central Banking in Underdeveloped Countries", in *Central Banking after Bagehot*, Oxford University Press, 1957, p. 128.

[2] S. Enke, *Economics for Development*, Prentice-Hall, 1963, p. 269.

[3] U Tun Wai, "Role of the Money Market in Supplementing Monetary Policy", in D. Krivine (ed.), *Fiscal and Monetary Problems in Developing States*, Praeger, 1967, p. 169.

[4] A. Basch, *El Mercado de Capitales en Colombia*, Centro de Estudies Monetarios Latinoamericanos, 1968, p. 91 (my translations throughout). It is noteworthy that Professor Basch felt compelled to state that securities "en circulación" are not necessarily circulating or even capable of being circulated (p. 74).

the designers. Nevertheless, within a few months, a market in these bills began to appear, and within a year, a broad and active market had been established. In this one case, therefore, a functioning government bill market was created almost before the government was aware that it was issuing bills.

II. Institutional History and Analysis

General fiscal incentives to increase exports[1] were first offered by the Colombian government in 1960.[2] Under this system, a firm could deduct 40% of the gross sales value of its exports from its net income from all sources in order to calculate its taxable income.[3] The system is considered to have been generally effective, although no serious assessment was ever made, and indeed it would have been difficult to discover which ultimate exemptions had been occasioned by which exports, not to mention the reverse. Because of the administrative problems of checking the tax exemption claims and because the exemption system was considered inadequate for firms in low tax brackets, the fiscal incentive was altered in March 1967.[4]

According to the new system, the exporter received, at the time that he converted his foreign exchange to Colombian pesos, not only pesos but also a tax certificate (i.e., a certificado de abono tributario; hereafter called, as in Colombia, CAT). This CAT was valued in pesos at 15% of the value of the exports[5] and could be used in payment of taxes one year after its date of

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[1] Of products other than unprocessed coffee, petroleum and its derivatives, bananas, cowhide and precious metals.

[2] The "exención tributaria" of Article 120, Law 81 of 22 December 1960 and Articles 1-4, Decree 1394 of 23 June 1961.

[3] Subject only to a generous maximum deduction.

[4] Articles 165-171 of Decree-Law 444 of 22 March 1967, and Articles 39-47 of Decree-Law 1366 of 20 July 1967.

[5] The percentage was initially fixed at 15%, but was to be reviewed annually and varied according to "the competitive position of Colombian exports in foreign markets" (Article 47 of Decree-Law 1366). The percentage has not yet been changed. As with the earlier system, certain exports (coffee, petroleum and its derivatives, and cowhide) were not eligible (Article 40 of ibid.).

issue. Since these CATs were explicitly made bearer issues and declared "freely negotiable" during the period to their maturity,[1] it might seem that the government of Colombia clearly intended an issue of one-year government bills, but in fact the delayed maturity appears to have been a by-product of other concerns. Partly, the government sought continuity with the previous system[2]; partly, it wished to avoid doubled revenue losses in the initial year of the new system; and partly, it was implementing the compulsive Colombian belief that whenever possible, assets should be rendered illiquid in order to ease the inflation problem (as, more prominently, with advance deposits on imports). That the one-year maturity was not considered a permanently valuable feature of the CAT is evidenced by the fact that the law required the period to be reduced as the "fiscal and monetary situation permits".[3] Finally, it should be noted that the CAT was "exempt from all kinds of taxes".[4] This attribute, as will be shown, was important not only to the CAT's effectiveness as an export stimulus but also to the rapid development of the CAT market.

The government's failure to anticipate the development of a market for CATs was partly due to its misconception about their nature. The President, in his "State of the Union" speech in July 1967, explained:

> The exemption to stimulate minor exports granted under Law 81
> of 1960 was far from adequate....The present government, in Decree
> 444 of 1967, transformed it into a subsidy granted by means of CATs.

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[1] Article 40 of Decree-Law 1366.

[2] Under the 1960 "exención", exports during a given year reduced the tax liabilities of that year, but, because business taxes are paid (usually) in equal quarterly or monthly installments over the following year, the actual tax reduction occured (on average) about one year after the export. (For a description of the tax collection process and timing, see M. C. Taylor et al, Fiscal Survey of Colombia, Johns Hopkins Press, 1965, p. 94.)

[3] Article 40 of Decree-Law 1366. The situation has not yet permitted.

[4] Ibid.

This subsidy will be equal to all, whereas the exemption represented
a greater tax saving the larger the taxable income involved.[1]

And more than two years later, the official government description was unchanged:

...the CAT is a subsidy that does not depend upon the profits the
exporter realizes....

An additional advantage of the CAT over the former [exemption]
system is the equal stimulus it offers, whereas the exemption dis-
criminated in favor of large and profitable firms.[2]

These two general beliefs -- that the new export incentive represented a great

change (beyond mere CAT negotiability) from the old exemption system, and that

the new incentive was equivalent to a subsidy (i.e., equal to all regardless

of tax rate) -- were (indeed, still are) widely held in government circles,[3]

and hence the powerful tax stimulus to the development of the CAT market went

unnoticed.

The other stimulus to the appearance of a market for CATs was the fact

that waiting a year to redeem CATs was not equally painful to all exporters.

While large firms, with sufficient internal funds and/or access to bank credit

(usually at less than 20% cost per annum), were willing to hold the CATs,

small firms with a perennial shortage of working capital were most anxious to

convert their CATs into cash. While CATs could be earned only by exporters,

they could be held and redeemed at maturity by any person or firm; thus, the

potential buyers of CATs consisted of any firm or individual in Colombia

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[1] *Message of the President of the Republic of Colombia, Dr. Carlos Lleras Rest-
repo, to the National Congress*, 20 July 1967, Vol. 1, pp. 164-165. That the ear-
lier *exención* system had offered a greater export incentive to those in high tax
brackets (see Appendix A) had been made obvious to the government by well-to-do
individuals and firms who purchased cattle at the ports in order to complete
their export. This practice foreshadowed the appearance of a market for CATs
(K. Laursen, *The Export Abono Scheme*, mimeo, Bogotá, 1 Dec. 1967).

[2] Government of Colombia, National Dept. of Planning, *Plans and Programs for De-
velopment, 1969/72*, Bogotá, 1 Dec. 1969, p. V101.

[3] That these beliefs are wrong is shown in Appendix A.

whose marginal tax rate was sufficiently high and whose discount rate was sufficiently low. Since the implicit interest earnings from holding a CAT were tax-free, and the earnings on alternative investments were not, the rule for the $j\underline{^{th}}$ firm (or individual) is: buy (or keep) CATs or sell them (if you have CATs to sell) as:

(1) $\qquad i \gtrless r_j (1 - t_j)$

where i is the market rate of discount on CATs, r_j is the relevant return on alternative uses of money by the $j\underline{^{th}}$ firm, and t_j is the marginal tax rate of the $j\underline{^{th}}$ firm.

III. The CAT Market

Exports made after 22 March 1967 were entitled to CATs. It is not known when the first informal transactions of CATs occurred, but the first formal bids and offers on the Bogotá Bolsa (i.e., Stock Exchange) appeared on 22 September 1967.[1] The first Bolsa sale was recorded on 2 October 1967 at a price of 0.75.[2] Shortly thereafter, sales began to be recorded on the other stock exchange (in Medellín) and markets appeared in the other principal cities of Colombia by means of newspaper classified ads.

The prices of early CAT transactions were erratic and recorded sales volumes small, but by the end of October a sizeable and regular market had appeared. Over the two-week period, October 23-November 3, for example, CATs worth nearly three million pesos (at maturity values) were transacted at discount rates of

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[1] Reported in Bolsa de Bogotá, Boletín No. 3564, 22 Sept. 1967, mimeo, Bogotá. No sale was then reported but the price was quoted at 0.60 bid and 0.70 asked (per CAT with maturity value of 1.00 peso).

[2] All sales records cited hereafter are from the relevant issues of the Bolsa de Bogotá Boletín.

about $2\frac{1}{2}$% per month.[1] The implicit discount rates rose temporarily to a peak

of $3\frac{1}{2}$% to 4% per month by the end of November and then fell sharply by mid-

January 1968 to about 2% per month (see Figure 1). The discount rates very

gradually declined thereafter and stabilized for most of 1968 at about $1\frac{1}{2}$% per

month (as shown, for example, by the November 4-8 1968 yield curve in Figure 1).

Rates over the next two years varied, but generally fell in the range from

$1\frac{1}{2}$% to $2\frac{1}{2}$% per month (see, for example, the March 3-6, 1970 yield curve in

Figure 1).

The early path of discount rates is readily explained. Almost immediately

upon the issue of CATs, cash-hungry, low-tax exporters began their search for

buyers. At first, however, relatively few buyers were interested in pieces

of paper whose reputation was not established and whose tax-exempt virtues

were not yet fully recognized. For a few months, the market belonged to the

venturesome and clever buyers -- and they were repaid in the fall of 1967 with

tax-free returns of $2\frac{1}{2}$% to 4% per month at a time when the nonbank rate for

taxable, well-secured, short-term loans was paying $2\frac{1}{2}$ to 3%.[2] Soon, however,

the demand for CATs on the part of high-tax firms and individuals began to out-

strip the supply, which after all was limited to 15% of the peso value of minor

exports. The final, equilibrium rates, of $1\frac{1}{2}$% to $2\frac{1}{2}$%, were not an unexpected

range. The most likely alternative assets for CAT-holders are low-risk nonbank

loans[3] which rarely earned less than $2\frac{1}{2}$% per month in the late 1960s. Thus,

depending upon the extent to which taxes due from the earnings from such non-

bank loans were actually paid, the CAT rate should be somewhat less than $2\frac{1}{2}$%.

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[1] See Figure 1. Before 23 October, it is impossible to calculate implicit discount rates as the maturity dates of transacted CATs were not recorded. The rates shown in Figure 1 are calculated from a weighted (by maturity value of sale) average of CAT prices for each maturity date. Only the month of maturity is recorded so it is assumed that the average CAT transacted matures on the fifteenth of the month.

[2] This nonbank market operates through classified ads and brokers.

[3] Most other short-term monetary investments are legally prevented from yielding positive real rates of return.

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Figure 1
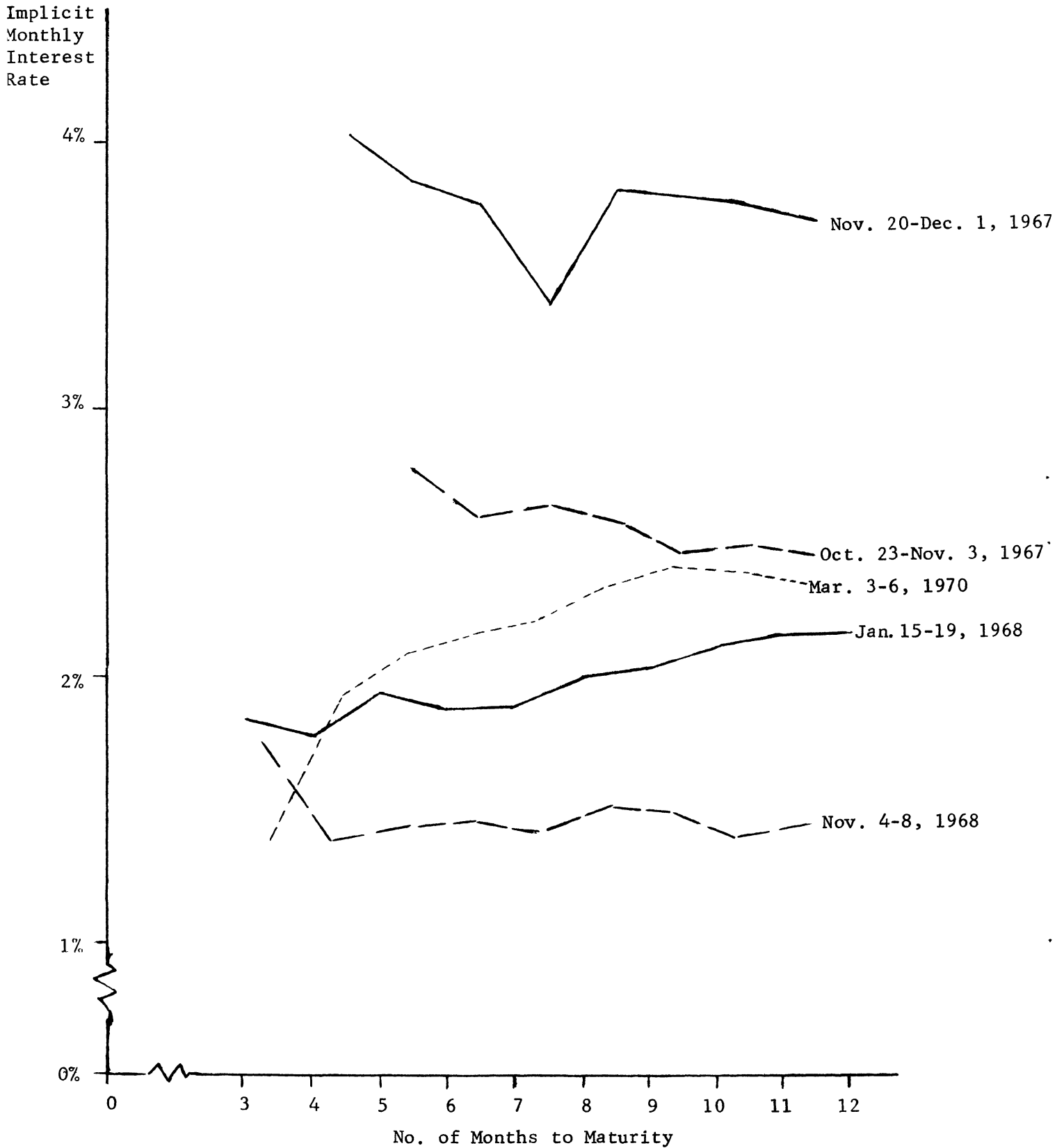
Yield Structure Implicit in CAT Sales

Table 1

Volume of CAT Transactions

(on the Bogotá Bolsa)

Month	Volume (millions of pesos)
Oct. 1967	2.13
Nov.	4.04
Dec.	1.51
Jan. 1968	9.24
Feb.	9.37
March	12.27
April	11.28
May	13.39
June	13.71
July	14.66
Aug.	18.21
Sept.	18.85
Oct.	20.27
12-month total: Nov. '67 - Oct. '68	146.80
Nov. '68 - Oct. '69	326.18

Note: Volumes measured at maturity value.

Source: **Boletines** of the Bogotá Bolsa.

The stabilization of the CAT discount rate was partly a function of the passage of time, but was also the result of an increasingly active market. The rising volume of transactions in the Bogotá Bolsa is shown in Table 1. By the end of October 1968, transactions in this market represented about one fourth of the total CATs ever issued; and by the end of October 1969, the fraction was nearly one half. Considering the existence of a Medellín stock exchange and informal CAT markets in other major cities, it is quite conceivable that a large majority of the CATs had changed hands at least once. Indeed, since a majority of the CATs were earned by firms whose maximum tax rates were 12% or less[1], it would be hard to believe that CAT transactions had not attained this level.

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[1] I.e., firms other than the large corporations (sociedades anónimas). See Appendix B and G. L. Eder **et al**, Taxation in Colombia, Commerce Clearinghouse, 1964.

Thus, within a year of the time when the Colombian government began its issue of treasury bills as part of an export incentive, a broad, stable, and active market had been created whereby exporters, most of whom had no incentive to hold the bills, sold them to non-exporters whose tax and discount rates were such as to make the bills an attractive investment.

IV. Lessons

The obvious lesson that the rapid development of the CAT market teaches is that short-term credit-instrument markets are not always so difficult to create. Indeed, under some circumstances, their appearance would be difficult to prevent. Of course, there are special circumstances surrounding the CAT situation that would not accompany more traditional bill markets. A bill "market" normally means the initial sale of bills to those who wish to hold them, and a "second-hand" market appears only marginally as some bill holders need cash during the life of the bill. In the case of the CAT, there is no initial market disbursal; and the second-hand market was greatly stimulated by the twin facts that CATs were initially acquired by many who had no interest in holding them and that many who did wish to hold CATs could not initially acquire them (without exporting). But this distinction between initial and second-hand markets is, in itself, insubstantial.

Why then the perpetuation of the belief that bill markets are difficult to establish? The answer, I think, lies entirely in the historical facts: many underdeveloped country governments have tried to establish bill markets over the last quarter-century, and most of these efforts have failed. The reason for these failures has, however, been missed; government efforts to establish bill markets have too often consisted of the attempted creation of an artificial demand for bills at an unrealistic interest yield. Such efforts do tend to fail

The successful growth of the Colombian market for CATs may well be attributed to the very lack of government involvement in its development.[1]

This lack of concern on the part of the Colombian authorities -- in the possibility of a second-hand CAT market when the system was introduced and in the actual market later[2] -- is especially surprising after two decades of eulogies to the virtues of bill markets in developing countries.[3] Perhaps the answer is that planning authorities, including central bankers, have not become convinced of the advantages of bill markets for allocation and/or stabilization. And perhaps they are not foolish in remaining unconvinced. As concerns stabilization, those underdeveloped countries that have desired to operate a conscious monetary policy have by now found ways to do so without recourse to the kind of open-market operations that require efficient, flexible securities markets.[4] The allocative issues are less obvious. The economic

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[1] Ironically, throughout the CAT market growth, the "market" for other Colombian government debt instruments remained stagnant. For example, the largest government issue, the "nacionales consolidados" issued in 1956 with a 5% (per annum) coupon rate, sold nominally throughout 1967 and 1968 at 95, which implies a yield to maturity (1976) of 5.3% per annum, or 0.43% per month. This at a time when nonbank short rates were well above 2% per month and when inflation had averaged about 10% per year over the preceding decade. Needless to say, these bonds are held almost entirely by banks and insurance companies that are required to so invest a fraction of their assets (see A. Basch, op. cit., pp. 91-94). A good indication of the market inactivity is given by the fact that transactions on the Bogotá Bolsa in "nacionales consolidados" amounted, over the year Nov. 1967 - Oct. 1968, to only one twentieth of one per cent of the total of 300 million pesos of such bonds "in circulation".

[2] Although there has been occasional discussion of possible open-market operations in CATs, and by the end of 1969, the government was advertising as one of the advantages of the CAT system that "since it is freely negotiable, it also serves as a valuable source of working capital" (Colombia Information Service, Colombia Today, Nov. 1969, p. 4).

[3] See, for example, E. Nevin, Capital Funds in Underdeveloped Countries, Macmillan, 1961, Chap. 5 and P. G. Fousek, op. cit., Chap. 7.

[4] Usually through variations in access to discount facilities and/or in reserve requirements.

advisor to the underdeveloped countries frequently clings to his Pareto-optimal efficiency conditions despite the obvious second-bestness of the economic environment; and just as frequently he cannot be faulted, for he has no better clear and operational advice to offer and does not wish to abdicate. With respect to capital markets, however, government policy itself intentionally contributes to these second-best distortions. The governments of developing economies have chosen direct allocation of investment funds as a principal means of creating compensatory distortions and achieving goals other than efficiency (such as growth, regional equity, industrialization, or autarky). This may not be wise policy, but given that it _is_ the policy, it is small wonder that first-best advice on the efficiency of capital and money markets goes unheeded. Moreover, once the government has elected to ignore (or minimize) the allocative role of interest rates, it has little incentive to create the undesirable income transfer mechanism that working (i.e., high interest rate) bill markets might imply.

Governments in developing countries may be wrong to overlook or reject the stabilizing assistance and allocative efficiency of functioning credit markets, but they are at least consistent when they subsequently show little interest in fomenting an active, voluntary bill market. Thus, in Colombia, the appearance of such a market caused but a momentary raising of the official eyebrow, while the official eye fixed steadfastly on the real business of directing credit allocation.

Appendix A

The relationships are here developed between a firm's (marginal) tax and discount rates and the extent of the export stimulus offered by each of the tax exemption , CAT, and subsidy systems. In order to isolate the tax aspects, the time-lags involved and the negotiability of the CATs are initially neglected.

Consider, typically in Colombia, a firm which would not export in the absence of some special stimulus and which enjoys a protected, at least somewhat monopolistic position in the domestic market. In the relevant output range, it has constant costs of c per unit of output; in maximizing domestic profits, it sets the domestic price above c, at $(1 + d)c$; and the world price (FOB, given exogenously, and converted to pesos at the export exchange rate) is below c, at $(1 - e)c$. (Since c is assumed not to change once exports begin, domestic prices, output, and profits are not affected by the export decision.) Two other symbols are needed: P, the additional after-tax profits due to the first unit of exports; and t, the marginal tax rate of the firm (assumed not to change due to the initiation of exporting).[1] The profitability of (the first unit of) exports under each of the three systems (exemption, CAT, and subsidy) can now be examined.

1. Exemption. Under the 1960 exemption, the firm could deduct 40% of its gross export sales from its net income from all sources for the purpose of calculating taxes. Thus P consists of two components, the (after-tax) loss on the export sale and the gain from a reduction in taxes; in symbols,

(A-1) $P = -(1-t)ec + 0.40t(1-e)c$

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[1] These assumptions are satisfactory for present purposes, since we only wish to examine the extent of the stimulus to the first unit of exports. Obviously, if we sought a model to explain the firm's optimum volume of exports, constancy of all of c, d, e and t would be inappropriate.

When terms are collected, it is seen that the firm would find it profitable to begin exporting (i.e., P > 0) if:[1]

(A-3) $e < \dfrac{0.40t}{1 - 0.60t}$

2.   <u>CAT</u>. Under the 1967 law, the profits of the first unit of exports again consists of two parts, the (after-tax) loss on the export and the gain from the non-taxable CAT worth 15% of gross export value; in symbols,

(A-4) $P = -(1-t)ec + 0.15(1-e)c$

The firm would find it profitable to begin exporting if:

(A-5) $e < \dfrac{0.15}{1.15 - t}$

3.   <u>15% Subsidy</u>. Under a straight subsidy (of 15%), the profit of the first export would be the after-tax profit of the export when the world price is effectively raised by 15%; in symbols,

(A-6) $P = (1-t)[1.15(1-e)c - c]$

The firm would find it profitable to begin exporting if:

(A-7) $e < .13$

The conditions for profitable exporting under each of the three systems (i.e., conditions A-3, A-5, and A-7) are illustrated in Figure A-1. It can there be seen that the CAT system is closer to a straight subsidy for the low

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[1]The exemption system did pose a limit (independently of changing values of c, d, e, or t) to exports by its restriction that the 40% deduction could not reduce taxable income from sources other than exporting by more than 50%. It is easily shown that the incentive therefore operated only as long as the volume of exports, as a fraction of the total output, was less than:

(A-2) $\dfrac{d}{0.80 + 1.20e + d}$

Unless d is low, however, this limit is not restrictive.

Figure A-1

Export Profitability Conditions Under the Three Systems
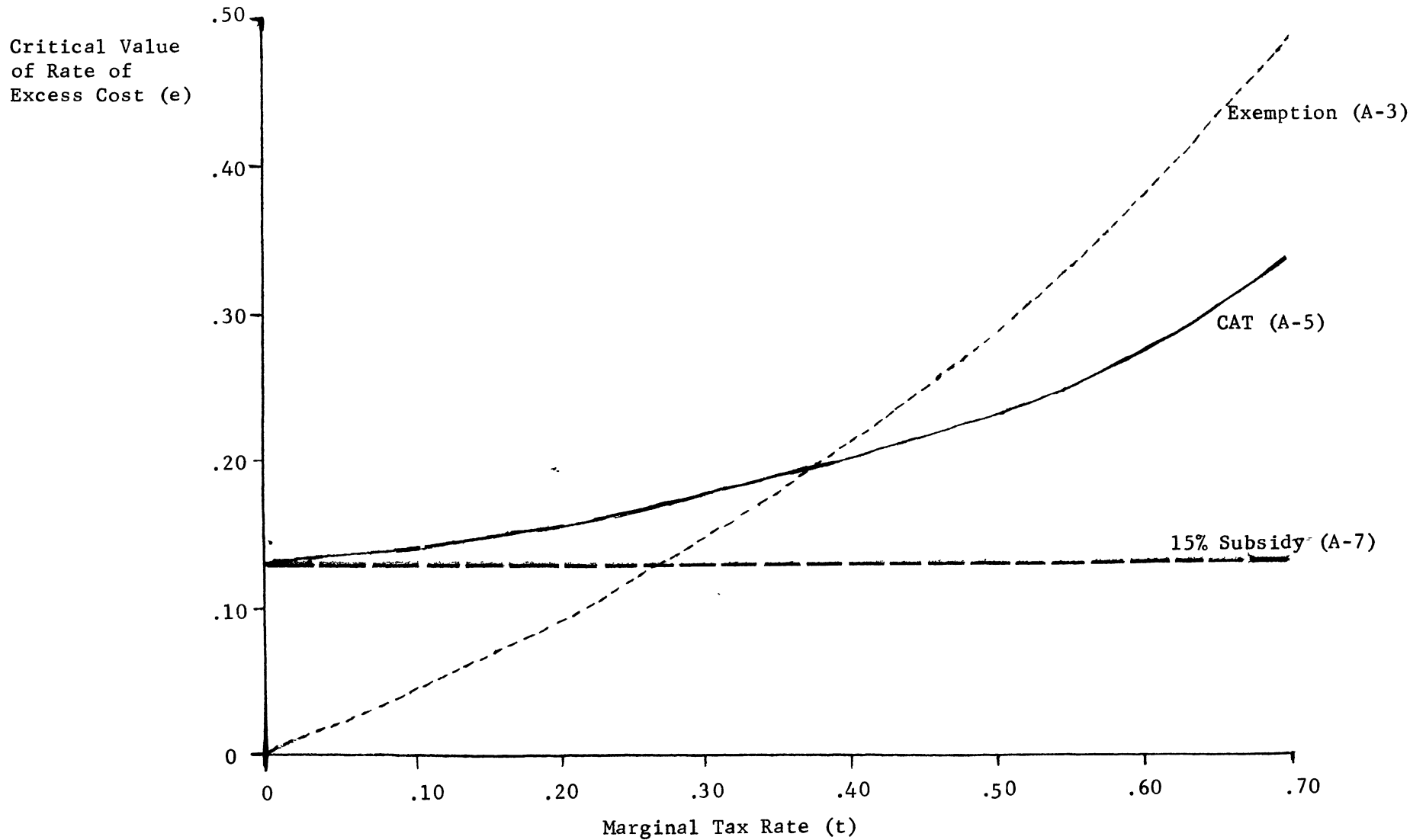
Note: Export is profitable if the excess of production costs over world price (as a percentage of costs) is no greater than the critical value of e.

tax-rate exporters, but retains the characteristics of the exemption system for high tax-rate exporters.[1]

In defense of both the exemption and CAT systems, it should be noted that the straight subsidy alternative not only is opposed by government (because expenditures are considered less desirable than tax reductions) and business (because it is feared that the government will renege by failing to appropriate the money) but also is in violation of GATT.[2] It has also been argued that the CAT (and exemption) system have the advantage that they give larger subsidies (than would be overtly feasible) to big, profitable corporations. Although this appears to countermand comparative advantage, it has been argued that these big firms are the important potential exporters, need special encouragement, and are presently disadvantaged by having to pay overhigh wages and corporate taxes.[3]

Introduction of the postponed maturity feature of CATs complicates the analysis only slightly. Letting i be the discount rate at which CATs can be bought and sold, it is clear that there is a stimulus for the jth firm to buy (and/or keep) or sell CATs according as

(A-8) $i \gtrless r_j(1-t_j)$

where r_j is the marginal rate of return on the jth firm's alternative, taxable uses of capital (and t_j, as before, is its marginal tax rate). Thus, the export stimulus of the CAT system must be differently analysed according to whether a firm would hold its earned CATs to maturity or market them immediately.[4]

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[1] It should be noted that the CAT system provides a lesser incentive to export (than the exemption system) for firms with marginal tax rates above 37.5%. For evidence suggesting that firms reacted to this apparently minor change, see Appendix B.

[2] Though Colombia, like many other underdeveloped countries, is not a signatory of GATT and though GATT sanctions are rarely imposed on poor countries, the fear exists that straightforward, obvious subsidies might invite retaliation.

[3] W. G. Rhoads, Differential Effects of Tax Credits and Exchange Rate Movements as Incentives for Minor Exports from Colombia, mimeo, Bogotá, 27 Feb. 1968.

[4] As long as i, r, and t are treated as constants, there is no reason to hold CATs for part of the time to maturity.

1. <u>Firms that would hold the CATs</u>. Analogously to equation (A-4), the present value of the firm's profit on its first unit of exports consists of its after-tax loss on export production and its untaxed gain from the CAT. Now, however, it is necessary to recognize that the export production loss is immediate, while there is a one-year delay to the tax recoupment and the CAT gain.[1]
Thus:

$$(A-9) \qquad P = -ec + \frac{tec}{1 + r - rt} + \frac{.15(1-e)c}{1 + r - rt}$$

since the appropriate discount rate is $r(1-t)$. The firm will find it profitable to export if:

$$(A-10) \qquad e < \frac{.15}{1.15 - t + r(1-t)}$$

It can be seen that the export stimulus is reduced by the one-year maturity feature of the CATs (and the tax recoupment delay).

2. <u>Firms that would sell the CATs immediately</u>. The profitability is identical to that of equation (A-9) except that the earned CATs are discounted immediately in the market at a rate, i:

$$(A-11) \qquad P = -ec + \frac{tec}{1 + r - rt} + \frac{.15(1-e)c}{1 + i}$$

The firm will find it profitable to begin exporting if:

$$(A-12) \qquad e < \frac{.15}{1.15 - t + \frac{(1-t)(i+ir+rt)}{1 + r - rt}}$$

Although inequalities (A-10) and (A-12) are more complex than inequality (A-5), the impact of changes in r, i, and t upon the critical values of e are not hard to discover. Given r and i (where relevant), the critical value of e behaves, with respect to t, as shown in Figure A-1, rising from $.15/(1.15 + r)$

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[1] Tax recoupment <u>averages</u> to a one-year delay; the CAT delay is exact. Any delay between production and export earnings is neglected (or subsumed in a higher e).

when CATs are held, or .15/(1.15 + i) when CATs are sold, to one as t rises from zero to one. The critical value of e falls (at a decreasing rate) as either r or i rises. Thus firms with high values of t and/or low values of r receive a greater stimulus to export. For firms which would sell the CATs they earn, the stimulus is clearly greater the lower is i.

In short, the amount of export subsidy offered by the CAT system varies among firms when the relevant values of t and/or r differ among firms. And similarly, the inducement to hold or sell CATs, once earned, is different.

Appendix B

The introduction of the CAT system provided a stimulus for the sale of CATs from exporters with low tax rates and/or high discount rates to exporters (and non-exporters) with high tax rates and/or low discount rates. The fact that such a market rapidly developed may be considered proof enough that Colombian businessmen were not slow to take advantage of this opportunity. Nevertheless, some additional evidence can be offered that Colombian exporters reacted in 1967 in a manner consistent with the altered incentives of the CAT system.[1]

The analysis of Appendix A shows that the CAT system increased the export stimulus for firms with marginal tax rates below 37.5% and reduced the stimulus to firms with higher tax rates.[2] Since most large corporations (i.e., sociedades anónimas pay a marginal tax rate above 37.5% and all other forms of business are much less heavily liable, the division of exporters by corporate form is instructive. For each of 1965, 1966, and 1967, there were 700-800 exporters,[3] about

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[1] Direct evidence from the CAT market itself is not possible since no formal information is available about the market participants.

[2] See Figure A-1.

[3] Excluding coffee exporters, who received neither the tax exemption before 1967 nor CATs in 1967. Crude petroleum exports need not be registered and hence are also excluded. Export data by firms are not available before 1965.

one fourth of which were anónimas.[1] The total minor (i.e., non-coffee,non-petro-leum)exports and the part made by anónimas are shown in Table B-1. The data are consistent with the hypothesis that the introduction of the CAT system in early 1967 offered a reduced incentive to exporters with high tax rates.

Table B-1

Total and Composition of Minor Exports

Year	Minor Exports (in US$ millions)		Percentage of Exports by Anónimas (3)
	Total (1)	by Anónimas (2)	
1965	113.9	49.5	43%
1966	106.8	50.6	47%
1967	122.8	48.1	39%

Source: Banco de la República, Export Registers.

This data can be checked on an anónima-by-anónima basis to insure that the decisions of a few large exporters have not caused these results. The export movements (relative to the previous year) in each of 1966 and 1967 by all big, and small anónima exporters are recorded in Table B-2. Although the percentage differences are rarely large, it should be noted that a greater fraction of the anónimas ceased exporting in 1967 than in 1966, and a smaller fraction began exporting or increased their exports. These percentages are consistent with the hypothesis that the CAT system provided a reduced incentive to export for anónimas.[1]

In short, the 1965-67 export evidence is consistent with the hypothesis that Colombian businessmen rapidly recognized the altered profit opportunities that the introduction of the CAT system presented.

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[1]Moreover, the evidence of Table B-2 suggests that "big" exporters, who would be expected to recognize more fully the altered nature of the export incentive, reacted more consistently and more dramatically (than the "small" exporters) between the two years.

Table B-2

Movements in Anónima Exports, 1965-67

Anónima Exporters

Percentage[1] of Anónimas whose Exports	All		Big[2]		Small[2]	
	1966 (1)	1967 (2)	1966 (3)	1967 (4)	1966 (5)	1967 (6)
Ceased	14%	20%	3%	8%	29%	37%
Fell (but did not cease)	39%	39%	39%	47%	40%	28%
Rose (but not from zero)[3]	47%	41%	57%	45%	32%	35%
Began[4]	20%	17%	8%	8%	37%	31%
(Total Number of Firms)	(152)	(161)	(89)	(93)	(63)	(68)

Notes: 1. The figure in each category is given as a percentage of the total number of anónima exporters in the previous year (i.e., bottom row.)

2. A "big" exporter is one whose exports totalled US$50,000 or more during 1965-67.

3. Totals of first three rows may not add to 100% due to rounding.

4. Or recommenced after a lapse of at least one year.

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