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Economic Evaluation of Schools' Participation in the Coles-Apple Computer Promotion

David Godden, Lynn Henry, Ross Drynan, Anna Buckley, Andrew Flitercroft,
Penny Hansen and Katrina Lysaght*

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1. Introduction

In each year from 1991 to 1993, Australian Coles supermarkets, in association with Apple computers, ran a promotion targeted at schools. In this promotion, Coles supermarket dockets collected by schools could be exchanged for computer hardware and software and, in 1993, for other equipment. At least two interesting microeconomic issues arose from this campaign. One issue involved Coles and Apple: was the promotion profitable from the viewpoint of the participating firms? A second economic issue concerned schools' participation in the promotion: including the reasons that schools chose to participate or not participate; and, if a school chose to participate in the promotion, the factors affecting the success of its participation. The focus of the present study was on the second of these issues - economic aspects of school participation in the Coles/Apple promotion.

Evaluation of the Coles/Apple promotion from the school's perspective has a wider economic dimension. In recent years, governments of all political persuasions have been reassessing public commitment to all levels of education (e.g. Marginson 1993). There has been increasing emphasis on decentralisation - for example, in the case of primary and secondary schooling, shifting some decision making from highly bureaucratised education departments to the individual school. In NSW, for example, global budgeting has resulted in schools being allocated a fixed sum for expenditure on all items other than the salaries of permanent staff or investment in school buildings. School management is required to administer its expenditure within this budget. This change has emphasised the importance of voluntary fund-raising efforts to supplement the fixed global budget.

Schools have also been permitted more flexibility in fundraising. They are now able to make sponsorship deals with local businesses in exchange for advertising in school publications or on school premises. In some instances, sponsorship deals have taken on a much larger dimension - for example, some of the relatively new "technology" high schools in NSW have entered relationships with major firms such as computer and aeronautical companies.

The changes noted above have moved the public pre-tertiary education system away from one which traditionally provided a similar service to all primary and secondary students towards one of greater diversity. Increasingly, schools are positioning themselves in an education market, and are attempting to differentiate their product from that offered by rival schools. Primary schools, for example, are competing by encouraging the provision of pre- and after-school care (important to the larger number of two-income families), by highlighting the provision of accelerated education and/or enrichment for high achieving students, and by increasingly offering what had previously been extra-curricular activities such as music in school bands and orchestras. In secondary schools, product differentiation has especially occurred through informal or formal curriculum specialisations in areas such as technology, performing arts and languages.

Increasing emphasis on the school "product", plus a political climate which increasingly demands decentralised decision making in public education, highlights the importance of economic decision making within schools. In particular, these changes in emphasis highlight the importance of school revenues not emanating from central government funds - for example, the funds raised by associated school bodies such as parents' and citizens' associations (P&Cs) and women's auxiliaries.¹ Since public - or, indeed, most private - schools are not profit-making firms, an alternative framework is required in which to examine the efficient allocation of school resources. Activities which the school undertakes include both revenue and resource gathering, and the use of these resources. This paper focuses on resource gathering. An appropriate framework to examine these activities might be that of the "not-for-profit" or "non-profit" firm (James and Rose-Ackerman 1986, Weisbrod 1988).

The school's participation in these resource gathering and resource using activities interacts with those of its workforce and managers, and also with its voluntary supporters (P&Cs, women's auxiliaries, occasional supporters). Not only is it necessary, therefore, to analyse the decision making of the school "firm" and its workforce, but also the resource decisions of its voluntary supporters. In particular, support given by voluntary workers absorbs their leisure time, and so analysis is required of their leisure-school support tradeoffs.

¹ Williams (1994) reported a spokeswoman for the Federation of Parents' and Citizens' Associations as saying "P and C associations now raise about \$21 million for NSW public schools".

Analysis of the Coles/Apple promotion reported here had two aspects. The first focused on participation by schools in this promotion. Even this narrow focus, however, required the establishment of an appropriate model in which to represent the various dimensions of the decision-making frameworks. The second aspect of the study was whether or not this analysis of a particular facet of school activities could be used to elucidate the likely resource - and, ultimately, educational - consequences for broad categories of schools of additional emphasis on their own resource-gathering activities.

2. Theoretical Framework

In New South Wales, three broad categories of school can be identified: State, systemic Catholic, and elite (including both Catholic and non-Catholic). Because of resource limitations, the analysis was confined to State schools; both the theoretical and empirical work would have had to have been modified if either systemic Catholic or elite schools had been included in the analysis.

2.1 Optimal resource gathering - State schools

Voluntary support by individuals

For simplicity, the amount of effort that an individual is prepared to donate to particular school activities was regarded as being determined by a three-stage separable process. In the first stage, the individual has preferences between money income and leisure which determine the amount of time an individual will devote to leisure. In the second stage, the individual has preferences between voluntary school activities and other leisure activities which determine the total time that individual would devote to voluntary school activities. Finally, an individual has preferences over participation in different types of school activities that determine the amount of time the individual is prepared to spend on each voluntary school activity. In this analysis, the total time an individual is prepared to spend on voluntary school activities is pre-determined by the individual's exogenously-given money income and the individual's (assumed invariant) 3-stage preference ordering over income and leisure (first stage), between total school voluntary work and "other" leisure activities (second stage), and among the various forms of voluntary school activities (third stage).

In this scenario, each individual provides a pre-determined amount of time to each voluntary school activity P_{ij}^* .

Funding from the State school's perspective

Suppose the public funding of State schools is exogenous to the individual school - that is, nothing the school does can change its level of State funding [without incurring extra costs?]. For example, funding may be formula based with a constant per capita grant for all students of a particular type (e.g. age group) and it is assumed that the school cannot affect its enrolments.² To raise the per capita level of resources, the school will have to resort to other measures. For example, schools have traditionally run canteens which provide a surplus to the school through P&C revenues, and P&Cs also undertake fund-raising activities to provide additional school financial resources. Schools also levy "voluntary" school fees (cf. Williams 1994), and may also rent out school facilities or provide advertising space for firms' displays in school grounds. School resources may also be augmented by voluntary labour such as working bees to maintain or improve school capital, or used to supplement teaching resources with voluntary labour.

In considering its funding options, the school is facing an optimising problem of the following form:

$$(1) \quad \max F = X + \sum_i Y_i(A, P_i, S_i)$$

where:

F is the total funds available to the school

² Although, clearly, many of the activities a school undertakes are aimed at increasing enrolments.

X is exogenous government funding

$Y_i = Y_i(A, P_i, S_i)$ are the school's endogenous funding production functions (e.g. running canteen, holding fetes, revenue equivalent of unpaid parent support activities in classes, asset maintenance etc.) depending on:

A - the school's attributes (e.g. location on major road that enhances its prospects to attract advertising signs)

P_i - adults' aggregate willingness to provide inputs for resource gathering in activity i (revenue raising and direct voluntary labour)

S_i - students' aggregate willingness to provide inputs for resource gathering in activity i (revenue raising and direct voluntary labour).

In the context of the previous description of individuals' decision about voluntary support for schools, a particular school therefore faces resource constraints for the voluntary revenue-raising functions of the following forms:

$$(2a) \quad P_i^* = \sum_j P_{ij}^* \quad j=1, \dots, J \text{ (parents), } J+1, \dots, J+K \text{ (teachers)}$$

$$(2b) \quad S_i^* = \sum_r S_{ir}^* \quad r=1, \dots, R \text{ (students)}$$

P_{ij} is individual/household j's (parents, teachers) provision of inputs for fund raising for activity i and $P_j^* = \sum_i P_{ij}^*$ is the total amount of time individual j is prepared to spend on voluntary school activities. The value of P_{ij}^* will depend on the initial work/leisure tradeoff, and the subsequent allocation of leisure time between voluntary school and other activities. Full-time employed workers have a high opportunity cost of day-time activities, and so these activities tend to be dominated by unpaid home workers (e.g. women's auxiliaries, unpaid class support teaching), whereas night-time and weekend activities are likely to have a higher proportion of full-time employed workers (e.g. P&Cs, playground working bees).

S_{ir} is student r's provision of inputs to fund raising activity i, and students are also assumed to have preferences functions leading to S_{ir}^* .

This only gives to the school the decision problem of providing the activities i to which individuals can devote their pre-determined time allocations P_{ij}^* and S_{ir}^* to each activity.

An alternative representation of the problem would provide the school with some influence over individuals' preferences between "other" and school leisure activities. For example, the school might be considered as having an "advertiser's" influence on an individual's preference function, by being able to persuade parents or students that the time they volunteer for school activities has a higher value than that which they would otherwise ascribe to this time. Alternatively, the school may also be able to influence parents' or students' relative preferences between different types of school voluntary activities.

2.2 The Coles/Apple Promotion

Background³

Coles' "Apples for the Students" promotion required schools to "bank" Coles docketts in an "account" with Coles against which "withdrawals" could be made to "purchase" hardware and

³ Information in this section was taken from Coles (n.d.) *Apples for the Students 1992 School Co-ordinator's Guide* and Coles (n.d.), *1993 School Co-ordinator's Guide*.

software.⁴ The basic "unit of account" was dollar expenditures at Coles supermarkets.⁵ Various marketing devices were used by Coles to maintain interest in the promotions - for example, at various times specific items were designated as "bonus" items which attracted additional docket values.⁶

Significant resources were required at the school to encourage collection of dockets, to receive and tally dockets (especially to account for bonus items etc. which had to be manually accounted for) and to "bank" dockets with Coles. Some schools went much further, communicating with their local communities, and businesses and service clubs in other communities, to solicit for dockets.

Coles provided support to participating schools in the form of suggestions as to how to administer the docket collection program within the school, including goal-setting, within-school competitions, using the promotion as an educational theme in class (e.g. using art, English and mathematics classes to prepare school promotional material and tabulate results), maintaining parent interest (including form letters), and approaching local businesses and the media. Coles also extensively supported the promotion in-store, and with extensive support in the broadcast and print media.

Each of these activities positioned Coles and Apple as the sponsors of the promotion. From Coles' perspective, the promotion served to directly encourage families to shift their purchases to Coles and/or increase purchases at Coles. The promotion also helped promote both Coles and Apple generically, and helped enhance the names of both companies as concerned and helpful corporate citizens. The promotion also provided some immediate increase in Apples' "sales" since it is understood that Coles paid Apple in part for the equipment obtained by schools. More importantly, for Apple, the promotion raised the profile of Apple/Macintosh computers in schools where attitudes to computing are formed.

In 1992, dollar values earned by Coles dockets could be used to purchase items as shown in Table 1.

The 1991 & 1992 Promotions - general results⁷

In 1991, the top 303 schools in Australia each collected more than \$0.445m in dockets (99 of these schools were in Queensland). The top 20 of these schools each collected over \$0.89m (13 of these schools were in Queensland). One school collected \$28,593 per student in 1991, with 25 schools raising more than \$10,000 per student.

In 1992, only 200 schools in Australia collected more than \$0.445m in dockets (87 of these schools were in Queensland). Only 10 schools collected over \$0.9m in dockets, of which 7 were in Queensland. On a per capita basis, the top school raised \$127,146 per student (5 students in school, Queensland); other Queensland schools raised \$61,001 per student (27 students - this school collected the highest total number of dockets in Australia), \$43,617 (17 students), \$27,077 per student (18 students), \$23,824 per student (19 students), \$16,445 per student (38 students); one NSW school raised \$15,000 per student (30 students), two Victorian schools raised \$95,291 per student (9 students) and \$22,653 per student (17 students), respectively. Docket collections for NSW schools are summarised in Table 2.

In both years of the Coles/Apple promotion for which data was available, there were interesting "cluster" effects in docket collections. Among the NSW schools which were in the top 303 Australian schools in 1991, 9 of these schools were local to The Entrance on the NSW Central Coast, and 7 other schools were close to Gosford in the same area. Other clusters in the top 303 schools were at Inverell (4 schools), Katoomba (3 schools), Lithgow (4 schools) and Moree (4

⁴ The 1993 promotion expanded the materials that could be obtained from the promotion to include audiovisual equipment, hardcopy and CD-ROM encyclopaedias, and calculators (Coles (n.d.) *Apples for the Students 1992 School Coordinator's Guide*).

⁵ It is understood that some Coles stores had supermarkets within large "hypermarket" stores, and that no distinction was made in the promotion between "supermarket" and "other" items on Coles dockets purchased at these stores.

⁶ In the 1993 promotion, \$20,000 in "free" dockets were earned by schools if they ordered their first Mac Colour Classic computer by 24 May 1993.

⁷ Information in this section is drawn from the following: Coles (n.d.) *National Report 1991*, roneo; Coles (n.d.) *National Report 1992*, roneo; Coles (n.d.) *Apples for the Students 1991 Honour Roll*, Coles (n.d.) *Apples for the Students 1992 National Report Card*.

schools). There was an equally dramatic cluster effect in 1992: in the top 10% of NSW schools (127 schools), there were 17 schools local to The Entrance and a further 17 schools close to Gosford; there were again also clusters at Katoomba (4 schools) and Lithgow (4 schools).

In 1991, 8,100 schools participated in the promotion throughout Australia of whom 5,366 obtained either hardware or software, comprising 5,388 computers, 2,309 other items of hardware and 17,902 items of software. In 1992, an estimated 4,790 schools participated, collecting \$939m in docket value.

Evaluating School Participation

In the context of the model of school revenue raising outlined in section 2.1, Coles' Apples for the Students Promotion is an activity $Y_i(A, P_i, S_i)$ which a school may use to augment its resource base by combining its attributes (A) with the efforts of parents (P_i) and students (S_i). A two-stage process was adopted to evaluating schools' participation in this promotion. In the first stage, factors were specified which were considered likely to determine whether or not a school would participate in the promotion. In the second stage, factors were specified which were considered likely to determine a school's degree of success in participating in the promotion (cf. Table 3).

A school's attributes could be expected to affect collection of Coles dockets in that:

- . schools whose parent base has ready access to a Coles supermarket would be more likely to shop there, compared to schools which are more distant from a Coles. Possible measures of this access include distance to nearest Coles, or rough measures of location of school (e.g. metropolitan, Newcastle/Wollongong, provincial (large country towns), small country towns or rural schools);

- . enrolments - in evaluating a school's aggregate collection of Coles' dockets, the larger the enrolment, the larger the expected collection of dockets; conversely, on a per capita basis, it may be easier to motivate the parents, teachers and students of smaller schools; there was, therefore, no a priori expectation as to coefficient sign. Enrolments were taken from NSW Department of School Education (1992);

- . the decision by a school to participate would be expected to depend on the value the school places on computing equipment and on its expectations as to the ease of collecting dockets. In regard to the latter, schools lacking teachers (or parents on school committees) who are highly enthusiastic about computing could be expected to show less interest in participating and in making a concerted effort to collect dockets. On the other hand, a school well endowed with enthusiasm for computing may be so well set-up with computers, or have computer systems based around IBM compatibles, that participation is seen to be of lesser marginal value.

Parent attributes likely to affect a school's activities with respect to the Coles/Apple promotion include:

- . since Coles is an up-market supermarket chain, schools with a more affluent parent base would be more likely to provide dockets since they would be more likely to shop at Coles as a matter of course; or might be more easily persuaded to shop at Coles, at least for the duration of the promotion. Possible measures of this affluence effect are to relate average income data from the census to the school's area. In country areas, however, income is likely to be more heterogeneous in a school area, and so evaluating the income effect was confined to metropolitan schools;

- . the higher the proportion of two-income families in the school's parent/teacher population, or the more children per family, the higher the opportunity cost for individuals to participate actively in collecting Coles dockets;

- . existing voluntary support for the school - if the time parents have available for voluntary school activities is rationed, then participation in the promotion would draw support from other voluntary school activities; conversely, a school with a well-motivated parent base may

be able to draw more support for specific activities; the school's current P&C expenditure was used with no a priori expectation as to coefficient sign;

. specific organisation for the Coles/Apple promotion - the way in which the school organised itself; positive relationships were expected between docket collections and positive responses to the docket collection mechanisms indicated in Table 3.

Non-survey data on per capita income, family size and female employment were taken from ABS (1988).

3. The Survey

A list of all state primary and secondary schools in NSW was obtained from the NSW Department of School Education (1992). Because participation and success were likely to vary for different groups of schools, schools were stratified along three dimensions: level of education (primary and secondary); location (Metropolitan, Newcastle/Wollongong, Provincial City, Rural); and for Metropolitan Sydney, regional average household income as a socio-economic indicator (low, medium and high). A 25% proportional sample was drawn from each stratum (Table 4). Questionnaires were mailed to school Principals with one follow up letter for initial non-responders. Response rates varied among strata, with most being in the range 30 to 60% (Table 4).

Two issues were of particular interest. First, what factors determined whether schools participated or not and, second, for those that participated, what factors determined the value of dockets collected. In answering the first, some form of discrete choice model or formal discriminant analysis might have been used. In the event, the less formal approach of descriptive analysis of each of the sets of participants and non-participants was used along with studying answers to the direct question asked of schools as to why they did or did not participate. To identify factors affecting docket collection by the participating schools, both descriptive and regression analyses were used.

4. Descriptive Analysis

4.1 Participation in promotion

The participation by surveyed schools in the Coles/Apple promotion in 1991 and 1992 is reported in Table 5. Amongst surveyed primary schools, about half participated in both years, about a quarter did not participate in either year, and about 8 per cent participated in one year only. Thus, in any one year, just under two-thirds of primary schools participated in the promotion, and one-third did not. Amongst the surveyed high schools, 37 per cent participated in both years, 44 per cent did not participate in either year, with 7 per cent participating only in 1992 and 12 per cent only in 1991. On average, therefore, in any one year just under half the surveyed high schools participated in the promotion, and just over half did not participate.

Schools which were remote from a Coles supermarket but which were primarily dependent on collecting Coles dockets resulting from purchases made by school families would have had severe difficulties in successfully participating in the promotion. Over 70 per cent of primary schools participating in the Coles/Apple promotion in the survey had a Coles supermarket in their town or suburb (Figure 1A).⁸ By contrast, over 90 per cent of non-participating primary schools were more than 20 km from the closest Coles supermarket in 1991 (Figure 1B). The percentage of "distant" schools not participating in the promotion in 1992 dropped substantially from about 60 per cent to 35 per cent with a corresponding rise in the percentage of schools with close Coles access not participating in the promotion. Similarly, more than 90 per cent of participating high schools were close to a Coles supermarket (Figure 1C) whereas nearly 80 per cent of non-participating high schools were more than 20 km from the closest Coles supermarket (Figure 1D). Distance from a Coles supermarket was clearly a major factor in inducing schools to participate in the promotion (cf. section 4.2).

⁸ All percentages reported in this paragraph are adjusted to *exclude* schools who did not specify a location relative to supermarkets.

Non-participating primary schools tended to have low numbers of Apple/Macintosh computers - approximately 80 per cent had less than 6 of these computers (Figure 2A). By contrast, participating primary schools had larger numbers of Apple/Macintosh computers - approximately 40 per cent had 1-5 of these computers, 30 per cent had 6-10 and approximately 25 per cent had 11-20 Apple/Macintosh computers (Figure 2B). It would appear that the Coles/Apple promotion succeeded in augmenting the computer resources of primary schools already well-endowed with computers compared to the non-participating schools.

High schools tended to be better-endowed with computers than the primary schools (Figures 2C and 2D). Non-participating high schools tended to have few Apple/Macintosh computers (about 20 per cent had 1-5 machines and approximately 50 per cent had 11-20 machines, Figure 2C). High schools participating in the promotion tended to have more computers than non-participants - approximately 15 per cent had 1-10 Apple/Macintosh computers, about 40 per cent had 11-20 of these machines, and about 15 per cent had 21-30 Apple/Macintosh computers (Figure 2D). Whether schools with relatively higher numbers of computers perceived the benefits of obtaining more, or whether these schools were simply better situated to participate in the Coles/Apple promotion, the outcome is clear - the Coles/Apple promotion resulted in more computer hardware and software ending up in schools which were already better-endowed with computers.

Expenditure by P&C's was expected to affect both the decision as to whether or not to participate in the Coles/Apple promotion, and also school success in the promotion. P&C expenditure for schools is shown in Table 6. Primary schools P&C expenditures were substantially less than those of high schools, reflecting the generally smaller size of primaries.

Schools who did not participate in the Coles/Apple promotion - and some of those who did - were clearly not happy about the nature of the promotion. These concerns covered the following five areas:

- . school too far away from Coles - disadvantages of country/rural schools
- . disadvantages of small schools
- . disadvantages of schools with DOS/IBM compatible computers
- . ethical objections
- . objections to nature of promotion

Comments volunteered by both primary and high school respondents included:

"Coles must be more aware of the problems facing isolated schools"

"Isolation of the school makes it virtually impossible to participate"

"programme's minimum quota disadvantages rural schools"

"as a small school they feel the effort expended was not worth it" (similar comments were made by many schools)

"school only uses IBMs"

"if school had Apples it may have made more of an effort"

"NSW Department of Education should not condone company exploitation of students"

"concept unacceptable"

"students should not worry about docketts - government should provide necessary computers"

"principal considered project exploited children"

"opposed to applying any inducement to children/parents to change shopping patterns to support one company under the guise of education"

"school got tired of pushing parents to shop at Coles when they didn't want to. Have serious philosophical problems with the programme"

"ethical reasons"

"school objects to principle but has been involved because otherwise it missed out. Believes country schools are disadvantaged [because of lack of Coles supermarkets]"

"the school will not be used as an advertising mechanism for non-government enterprises"

"the scheme should reward students' work at school - not shopping"

"it takes business from local stores & the school will not support it"
 "The school policy - not push Coles as a shopping venue"
 "concern over school promoting one supermarket over another"
 "believe it is not appropriate for private enterprise to be forming this kind of relationship"
 "school has limited success because parents tend to support the "cheaper" food stores"
 "direct sponsorship to schools without involving children"
 "parents support the local supermarket"
 "Object to advertising - particularly TV, which portrayed schools as bleak, deserted places of learning and supposedly with Coles they would provide computers to overcome this"
 "Coles is not the closest or cheapest shopping centre. The school clientele is mainly welfare/disadvantaged groups"

4.2 Non-participating schools

Non-participating schools were asked to indicate the reasons for this non-participation, and changes to the promotion that might induce them to participate in the future. The major reason for non-participation was access to Coles - over 60 per cent of both non-participating primary schools and high schools listed this as the major factor for non-participation (Figures 3A and 3B). About 40 per cent of non-participating primary schools nominated school size as a factor influencing their non-participation - since success in the promotion was based on *aggregate* collection of docket rather than dockets collected per student, smaller schools would have been disadvantaged by the promotion.⁹

About 20 per cent of primary schools listed distributional or ethical objections to the Coles/Apple promotion (cf. section 4.1).

The principal factor that would induce more primary schools to participate in a future Coles/Apple promotion was better access to Coles (Figures 3C and 3D). By contrast, the principal factor that would induce more high schools to participate in such a promotion was making DOS/IBM-compatible computer equipment available through the promotion.

5. Participating Schools

5.1 General

The patterns of docket collection in the participating schools who responded to the survey are summarised in Figures 4A (primary schools) and 4B (high schools). The modal collection class for primary schools was \$0-50,000, comprising approximately 40 per cent of respondents in both 1991 and 1992.¹⁰ In the responding high schools, low collections also dominated: 40 per cent of schools were in the class \$0-100,000. This picture of the dominance of relatively low collection achievement presents a useful contrast to Coles' literature which, justifiably from a promoter's perspective, emphasises the high achievers.

The methods of docket collection employed by schools are summarised in Figures 4C (primaries) and 4D (highs). The most striking aspect of these results is that primary schools slightly increased their docket collection activities outside Coles' supermarkets in 1992 but substantially increased their use of rosters to coordinate this activity. By contrast, however, high schools decreased their presence outside Coles in 1992 and dramatically decreased their rostering of this activity. In 1992, Coles explicitly directed - and emphasised by using bold type - that "We cannot allow soliciting for dockets on or near our Store premises or parking areas" (Coles (n.d.), *Apples for the Students: 1992 School Coordinator's Guide*). The "Coles coop" category in Figures 4C-D records whether or not a school found Coles "cooperative in allowing [docket] collection to occur outside the store"

⁹ In its promotional literature, Coles emphasises the successful small schools who participated in the promotion (cf. section 2.2) However, Coles literature also shows that most - although not all - of the successful schools in 1991 and 1992 tended to have more than 200 students. Successful small schools appear to be those who have been entrepreneurial in collecting Coles dockets - e.g. by contacting businesses and service clubs in major, particularly metropolitan, centres to collect on the school's behalf. There is, however, clearly a limit to the number of schools that could benefit from such a strategy.

¹⁰ footnote: Coles' documentation reports no NSW/ACT schools in this category in 1991, and 25 per cent in 1992; cf. Table **.

Despite the 1992 directive and the increased activity by primary schools outside Coles stores in 1992, respondents reported a slight increase in cooperation from local Coles staff in 1992.

5.2 Econometric analysis

The factors likely to influence participating schools' docket collection were examined by regression analysis. Responding schools' data was pooled for 1991 and 1992 and models estimated as reported in Table 7.

(a) High Schools

Analysis of high schools' data was difficult because only 40 high schools in total responded to the survey, of which only 28 data points of high schools participating in the Coles/Apple promotion were econometrically useable. With a large number of dummy variables, collinearity problems resulted and it was difficult to obtain sensible results when many variables were included. The model reported in the first two columns in Table 7(a) appears to provide the best explanation of the responding schools' success in docket collection.

Of the "school" variables, the following appear to have generally affected docket collection. When adjusted for all other factors, "provincial" (large country town) high schools collected about \$43,000 less on average than rural, Newcastle/Wollongong or metropolitan highs. Each additional student in a school was associated with an additional \$247 of Coles dockets (this result is remarkably similar to the corresponding estimate of \$258 for primary schools; cf. Table 7(b)). A one unit rise in the ratio of Macintosh computers per student was associated with an increased docket collection of \$1.1m (note that, because this variable is a ratio with a value substantially less than unity, a one unit rise corresponds to a dramatic increase in the number of Macs for a school of a given size). An additional Mac computer in a school was associated with an increased docket collection of \$1490. The aggregate effect of an additional Mac in the school is obtained from the partial derivative of the estimated equation with respect to the number of Mac computers, and is approximately \$2,500.

Both the parent variables affected docket collections in the expected direction. An increase of one unit in the child per female ratio was associated with a reduction of docket collections of \$154,000; and an increase in the female employment ratio of one unit was associated with a reduction of docket collections of \$200,000. Note again that, because both of these variables are ratios, real difference in the value of these variables between schools will not be unit differences but differences at the level of the first or second decimal point; hence the magnitudes of the effect of these variables on docket collection are not as dramatic as the size of the estimated coefficients implies.

The effect of the ways in which surveyed high schools chose to organise Coles docket collections is indicated by the last part of Table 7(a). Activities outside Coles supermarkets appear to have had little effect on high schools' docket collections, nor did the use of ad hoc groups to organise docket collection. Activities positively associated with docket collection appear to have been organisation by existing school bodies such as the P&C, and the use of incentives to encourage students to bring in dockets. The use of special docket collection days, however, appears to have been a disastrous strategy; schools who used this technique collected on average \$94,000 less than schools which did not.

(b) Primary schools

Because a much larger number of primary schools who participated in the promotion responded to the survey, a much more comprehensive econometric analysis was possible. By pooling both years of the promotion, 137 observations were useable. The "control" case is that of the *rural* primary school. Emphasis is placed on the model in the last two columns of Table 7(b).

Among the school variables, provincial primary schools collected similar docket amounts to rural primary schools when all other factors were held constant. Surprisingly, Newcastle/Wollongong and Sydney schools performed much worse in docket collections than rural and provincial schools. Newcastle/Wollongong schools collected on average \$60,000 less than rural and provincial schools, and Sydney schools collected on average \$53,800 less (model in first 2 columns). Sydney schools in the low and medium income categories collected similar docket amounts (last two columns of

Table 7(b)); somewhat surprisingly, high income primary schools collected, on average, \$89,500 dollars less docket than rural/provincial primary schools. The location of a Coles in the school's town or suburb does not appear to have had a statistically significant effect, and the estimated magnitude of this effect (\$22,000) also is relatively small. As previously noted, the enrolment effect was similar to that of high schools - an additional student at a school was associated with collection of an additional \$258 in dockets. The number of Macs in the school and the ratio of Macs/student did not have significant impact on docket collection - this result may be due to the previously-noted fact that primary schools generally had relatively small numbers of all computers.

There was no statistically significant effect of parental variables such as children/female or female employment ratio on docket collection. However, docket collections were positively related to existing P&C expenditures, although the magnitude of this effect was small (an extra \$1,000 of P&C expenditure was associated with an extra \$963 in dockets).

A school's organisation of its docket collecting activities had the following effects. The provision of incentives for students to bring dockets to school appears to have been worth an extra \$38,000 in dockets. The mere staking-out of Coles stores appears to have no discernible effect; what appears to have been important was to *formalise* this activity by rostering people to this activity - such formalising appears to have been worth an extra \$63,000 in dockets. Whether or not Coles was "cooperative" with collection or rostering appears to have had little impact. The use of special collection days possibly had a small (\$28,500) effect in reducing docket collections. Oddly, with the primary schools, the use of either existing organisations or ad hoc groups to coordinate docket collection appears to have had a small (approximately \$20,000) *negative* effect on collections; the survey may have missed out on the Coles docket activity being substantially coordinated by the teaching staff.

6. Conclusion

The Coles/Apple promotions of 1991 and 1992 were sufficiently rewarding to both Coles and Apple that the promotion was repeated in 1993. The promotion was clearly rewarding to many schools, although there was a clear message in the survey that many schools did not think their returns from the promotion justified the resources they had expended. Many schools were deterred from participating in the promotion because of a lack of access to Coles supermarkets; many of these "deterred" schools were rural schools. However, those rural and provincial primary schools who *did* participate in the promotion performed better than *similar* schools in Newcastle/Wollongong and Sydney. However, since many rural schools are significantly smaller than many Newcastle/Wollongong and Sydney primary schools, their small size was still a disadvantage because docket collections were positively related to school size, and also P&C expenditure which is also likely to be related to school size. (Of course, to obtain the same number of Macs *per student* from the promotion as a large school, a small school did not need to collect as many dockets.) A significant minority of schools had strong objections to the nature of the promotion: some felt, however, that they had to participate despite these objections to prevent their students being disadvantaged relative to other schools.

There is a strong suggestion in the high school results that demographics affected docket collections. In areas of larger family size and where more females participated in the labour force, docket collections were substantially and significantly lower.

The general result as far as the specific promotion itself is concerned is that the Coles/Apple promotion had two sets of differential effects. Firstly, the nature of the promotion itself discriminated against the *participation* of those schools with limited or no access to Coles supermarkets. This is not likely to be of concern to the promoters of the promotion - indeed they can identify remote schools which, through entrepreneurial efforts, have secured large docket collections. However, logically these kinds of efforts cannot be open to all schools, since the marginal return from additional schools using such methods is likely - at least at some point - to become negative. However, the promotion has clearly enabled some schools to obtain increased computer resources whereas others have been deterred from doing so. If computers are important in contemporary primary and secondary education, and a reasonable equality of access to education opportunities is socially desirable, then the existence of such programs as the Coles/Apple promotion which exacerbates inequality must be important in social policy formation.

Secondly, schools who participated in the promotion were likely to be more successful the *larger* they were, the greater the existing P&C expenditure (primary schools), the larger their existing stocks of computers (high schools), the lower the child/female and female employment ratios (high schools), and the better the access to Coles stores (for rostered collections, primary schools). Most of these characteristics seem to favour schools in non-rural or more affluent areas.

On the wider question - the desirability of opening the public education system to more entrepreneurial school decision making - clearly cannot be answered by this limited study. On the one hand, since rural and provincial primary schools who did participate in the Coles/Apple promotion were able to be more successful than otherwise *equivalent* counterparts in Newcastle, Wollongong and Sydney in collecting Coles dockets, it may be suggested that such schools may be able to offset particular and serious disadvantages that they face in becoming increasingly responsible for the funding of their schools. Conversely, however, the importance to docket collection of school size, both directly and through the activities of the P&Cs, suggests that some schools may be disadvantaged in a system that demands they be responsible for an increasing amount of their own resources. For example, if there is a threshold effect - such as a minimum docket collection necessary to obtain a particular type of computer - small schools may never be successful because they do not have enough resources to achieve the threshold. There is therefore the suggestion from this study that increasing the requirement for schools to obtain for themselves a larger proportion of the resources they consume will disadvantage rural schools and those in relatively poor areas. Neither of these outcomes would be acceptable in a system that supported equality of access to education.

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Table 1: Examples of Items offered in 1992 Promotion

Hardware	docket amount (\$'000)	Software	docket amount (\$'000)
Mae Classic 2Mb (no hard disk)	120	Dinosaur Discovery Kit	7
Mae Classic 2/40*	145	Granny's Garden	9.5
Mae Classic II 2/40*	190	Kid Pix	12
Mae LC II 2/40*	200	Math Rabbit	15.5
Mae LC II 2/80*	295	Educational Games for Young Children	20.5
Mae PowerBook 100 2/20*	285	Logowriter	43.5
LaserWriter NTR	275		
Stylewriter	75	Solar System Database	13
Imagewriter II	75	Concertware+	15.5
AppleCD SC Plus	100	Australian Government Database	18
Apple OneScanner	120	Calculus	19
Pocket Rocket Modem 1234	40	Think Pascal	24.5
AutoModem 1234	50	3D Images	28
		Australian Computerised Vocational Interest Inventory	48.5
		Pagemaker 4.2	55

Note: * Mb RAM/Mb hard disk

Table 2: School Docket Earnings, New South Wales, 1991 and 1992

Docket Range (\$'000)	1991*	1992
0-49.9		330
49-99.9	105	313
100-249.9	608	495
250-499.9	187	171
500-1,000	49	27
1,000-	2	1

Sources: Coles (n.d.), National Report, 1991, range; Coles (n.d.), School Collection Balances by Docket Value, 26 October 1992.

Note: Coles' documentation records no schools collecting less than \$50,000 in 1991.

Table 3: Factors Affecting Schools' Participation and Success in Coles/Apple Promotion

Factor	Participation	Success
<i>School attribute</i>		
. size	*	*
. location (Sydney, Newcastle/Wollongong, provincial, rural)	*	*
. access to Coles	*	*
. disadvantaged school	*	*
. existing computer stocks - type and number	*	*
<i>Parents/Students</i>		
. existing P&C expenditure	*	*
. per capita income	*	*
. 2-parent households		
. methods of organisation for Coles promotion		*
. docket donations		*

TABLE 4: Surveys Sent and Received By Class

(a) High Schools

	SYDNEY Newcastle/Wollongong			Provincial	Rural	Total
	Inc 1	Inc 2	Inc 3			
Size 1						
No in class		1			12	13
No. sent		1			4	5
No. received		0			2	2
% responded		0%			50%	40%
Size 2						
No in class	4	49	29	15	20	157
No. sent	1	18	11	6	7	58
No. received	1	1	4	4	1	18
% responded	100%	6%	36%	67%	14%	47%
Size 3						
No in class	4	56	25	21	27	165
No. sent	1	21	11	8	10	63
No. received	0	4	3	1	6	19
% responded	0%	19%	27%	13%	60%	42%
Total						
No in class	8	106	54	36	47	335
No. sent	2	40	22	14	17	126
No. received	1	5	7	5	7	39
% responded	50%	13%	32%	36%	41%	45%

(b) Primary Schools

	SYDNEY Newcastle/Wollongong			Provincial	Rural	Total
	Inc 1	Inc 2	Inc 3			
Size 1						
No in class	4	89	70	93	39	539
No. sent	1	22	17	23	9	139
No. received	0	10	9	13	4	62
% responded	0%	45%	53%	56%	45%	45%
Size 2						
No in class	16	160	121	83	67	158
No. sent	4	40	31	20	17	40
No. received	2	16	13	7	11	16
% responded	50%	40%	42%	35%	65%	40%
Size 3						
No in class	1	10	2		9	13
No. sent	0	3	0		2	3
No. received	0	1	0		0	1
% responded	0%	33%	0%		0%	33%
Total						
No in class	21	259	193	176	115	710
No. sent	5	65	48	43	28	182
No. received	2	27	22	20	15	79
% responded	40%	42%	46%	47%	54%	43%

Table 5: Participation in Coles' Apples for the Students Promotion

Participation	Primary Schools	High Schools
1991 and 1992	55.6	36.6
1992 only	7.7	7.3
1991 only	9.5	12.2
Not participate	27.2	43.9
number of respondents	169	41

Source: survey

TABLE 6: P&C Expenditure Levels in Participating and Non-participating Schools (averaged over 1991 and 1992)

(i) Primary Schools

P&C Expenditure	Per Cent of Schools
Not Specified	40.5
\$0 to \$2,000	38.1
\$2,000 to \$10,000	15.5
\$10,000 to \$20,000	3.0
\$20,000 to \$30,000	1.8
\$30,000 to \$40,000	0.6
\$40,000 to \$50,000	0.0
\$50,000 to \$60,000	0.6
\$60,000 +	0.0

(ii) High Schools

P&C Expenditure	Participating (%)
Not Specified	32.5
\$0 to \$2,000	12.5
\$2,000 to \$10,000	12.5
\$10,000 to \$20,000	25.0
\$20,000 to \$30,000	7.5
\$30,000 to \$40,000	2.5
\$40,000 to \$50,000	5.0
\$50,000 to \$60,000	2.5
\$60,000 +	0.0

Table 7: Estimated Regressions

(a) high schools (dependent variable - docket collections)

variable	<u>Location modelled</u>		<u>Location excluded</u>	
	Estimated coefficient	t-statistic	Estimated coefficient	t-statistic
constant	-0.4347	-0.01	6.700	0.16
<i>School</i>				
provincial enrolments	-43.22	-1.83		
Maes/student	0.2467	4.23	0.2184	3.61
Maes (no.)	1104.	1.72	911.1	1.34
<i>Parents</i>				
child/fem	1.490	1.65	1.611	1.67
fem empl	-154.2	-2.35	-125.3	-1.83
<i>Organisation of Coles/Apple promotion</i>				
collection days	-199.9	-1.86	-211.8	-1.83
incentives	-94.71	-0.95	-192.5	-2.14
P&C organisation	52.59	2.27	47.87	1.93
ad hoc organisation	18.15	0.15	155.3	1.50
Coles collection	50.30	1.63	23.71	0.81
Coles rostered	69.47	0.94	13.60	0.19
Coles cooperate	15.08	0.23	-15.59	-0.23
	-8.809	-0.17	27.33	0.52
adj. R2	0.68		0.63	
SER	42.23		45.39	
n	28		28	

(b) primary schools (dependent variable - docket collection)

variable	Location only		Location + income	
	Estimated coefficient	t-statistic	Estimated coefficient	t-statistic
constant	22.85	0.35	27.29	0.41
<i>School</i>				
New/Woll	-57.9	-2.3	-60.08	-2.33
provincial	-8.876	-0.31	-9.93	-0.34
Sydney	-53.81	-2.11	SydneyL -50.04 SydneyM -52.03 SydneyH -89.52	-1.87 -1.61 -1.66
Coles sub/town enrolments	21.92 0.2578	1.16 5.27	22.06 0.2578	1.1 5.23
Maes (no.)	-2.154	-1.34	-1.975	-1.2
Maes/student	84.03	0.74	85.34	0.74
<i>Parents</i>				
child/fem	6.759	0.14	10.99	0.22
fem empl	62.79	0.52	45.79	0.36
P&C expend.	0.9899	1.97	0.9629	1.9
<i>Organisation of Coles/Apple promotion</i>				
collection days	-27.27	-1.37	-28.51	-1.42
incentives	40.12	2.5	38.19	2.31
formal org.	-21.19	-1.34	-21.22	-1.32
ad hoc org.	-23.19	-1.29	-22.63	-1.23
Coles collection	4.144	0.18	3.989	0.17
Coles rostered	59.88	2.11	63.22	2.17
Coles cooperate	20.46	0.86	22.17	0.91
adj. R2	0.35		0.35	
SER	77.48		77.95	
n	137		137	

FIGURE 1A: Influence of Distance to Coles on Participating Primary Schools (123 Schools)

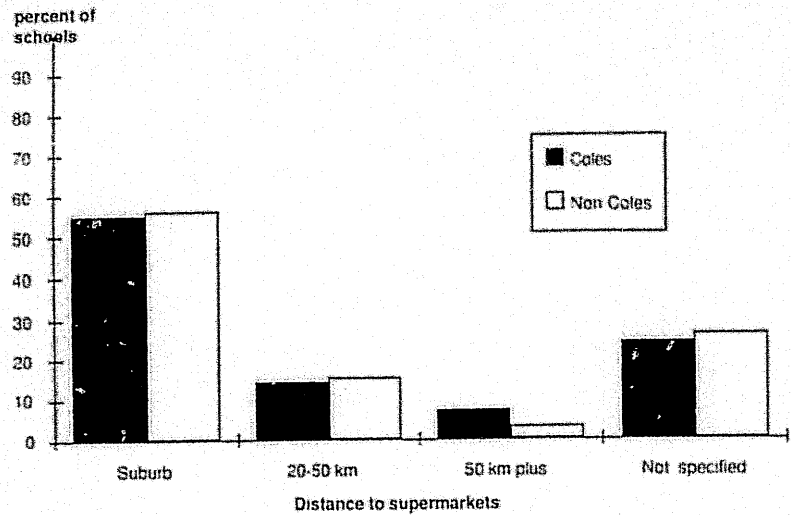


FIGURE 1B: Influence of Distance to Coles on Non-Participating Primary Schools (49 Schools)

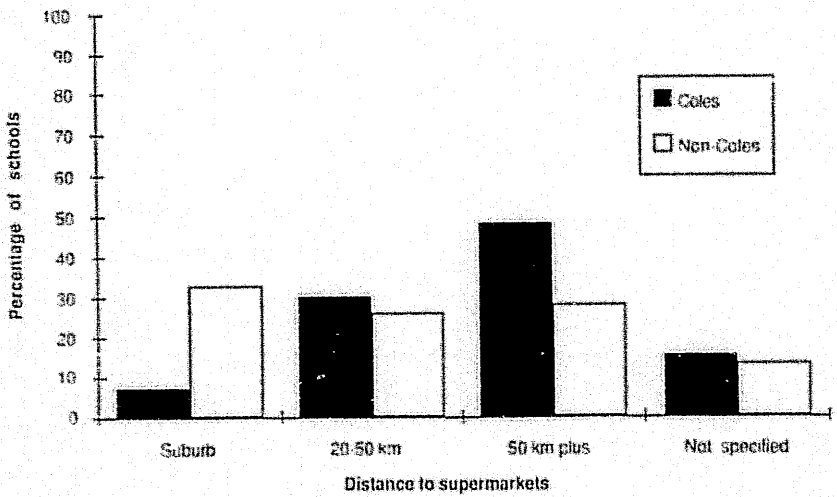


FIGURE 1C: Influence of Distance to Coles for Participating High Schools (29 Schools)

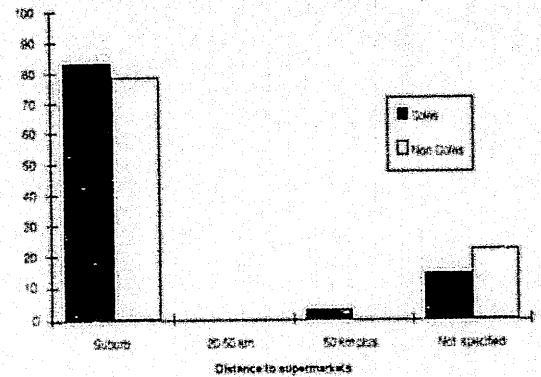


FIGURE 1D: Influence of Distance to Coles for Non-Participating High Schools (19 Schools)

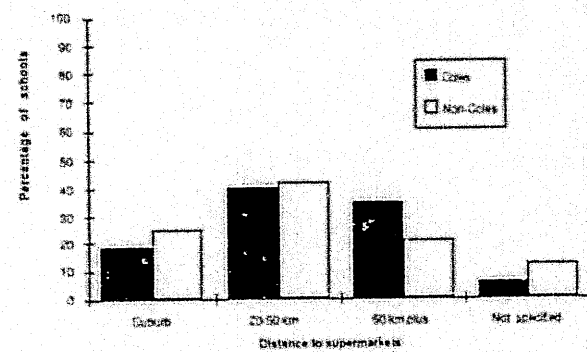
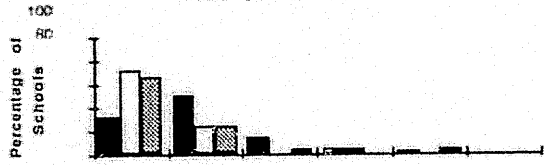


FIGURE 2A

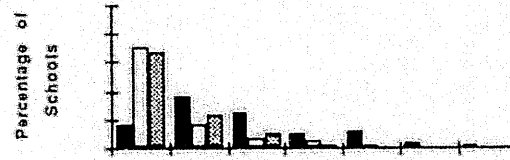
Non-participating Primary Schools' Computer Stocks (49 Schools)



School Computer Stocks - Prior 1991

FIGURE 2B

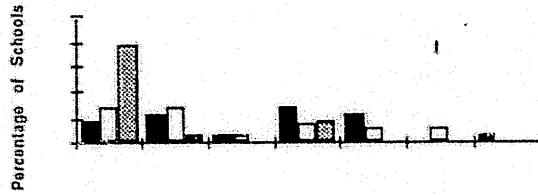
Participating Primary Schools' Computer Stocks (123 Schools)



School Computer Stocks Prior to 1991

FIGURE 2C

Non-participating High Schools' Computer Stocks (19 Schools)



School Computer Stocks - Prior 1991

FIGURE 2D

Participating High School Computer Stocks (23 Schools)



School Computer Stocks Prior 1991

FIGURE 3A
Factors Influencing Non-participation by Primary Schools (49 Schools)

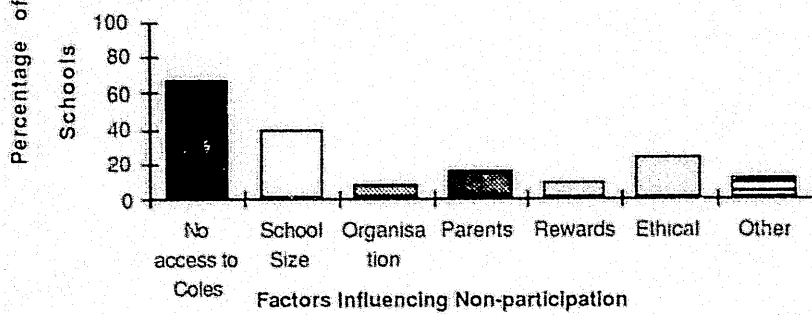


FIGURE 3B
Factors Influencing Non-participation by High Schools (19 Schools)

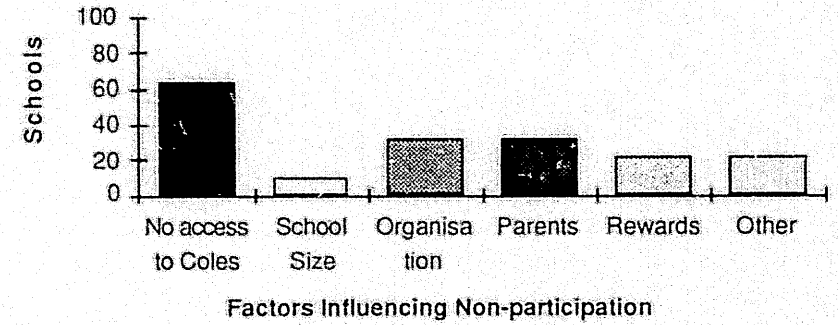


FIGURE 3C
Non-participating Primary Schools (49 Schools)

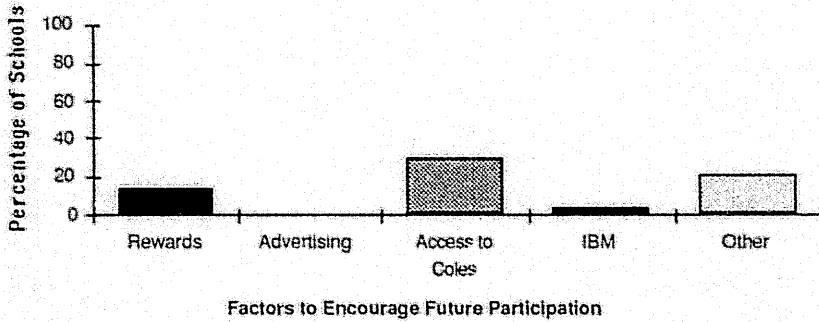


FIGURE 3D
Non-participating High Schools (19 Schools)

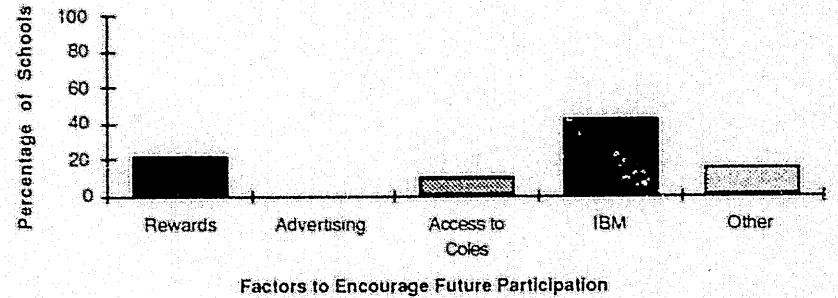


FIGURE 4A

Total Value of Dockets Collected by Participating Primary Schools (123 Schools)

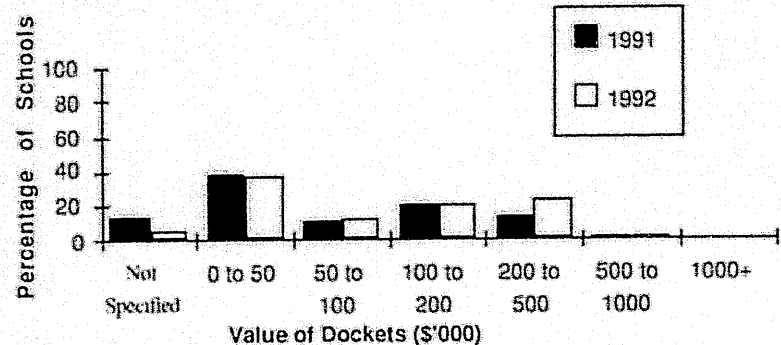


FIGURE 4B

Total Value of Dockets Collected by Participating High Schools (49 Schools)

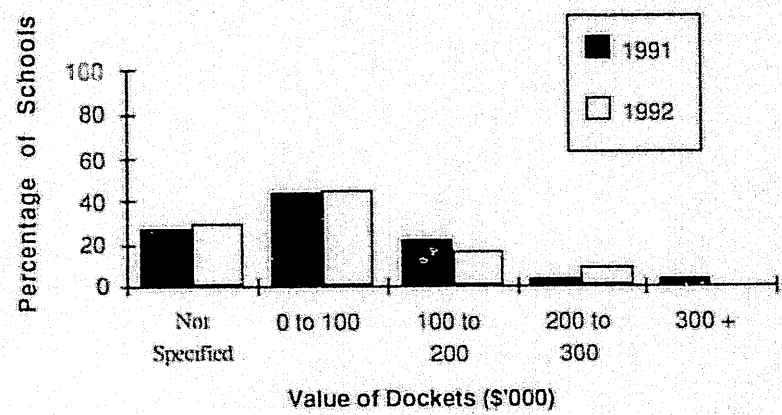


FIGURE 4C
Methods of Docket Collection Employed by Participating Primary Schools (123 Schools)

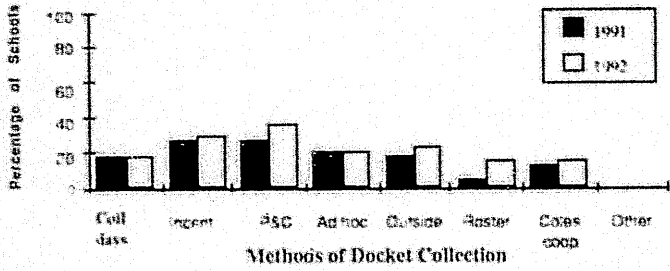


Figure 4D
Methods of Docket Collection Employed by Participating High Schools (23 Schools)

