POLICY RESEARCH WORKING PAPER 1422

Efficiency in Bulgaria's Schools

A Nonparametric Study

Željko Bogetic
Sajal Chattophadyay

More efficient use of school classrooms in Bulgaria's sparsely populated rural areas could free up funds to spend on other educational essentials.

The World Bank
Europe and Central Asia, Country Department I
Country Operations Division
February 1995

Summary findings

In Eastern European countries in large social sectors such as education, inefficiency and technical deficiencies are the legacy of the old command economy.

Bogetić and Chattophadyay examine the technical efficiency of classroom use (defined as the number of classes per classroom) in one transitional economy: Bulgaria. They examine that concept of efficiency in 199 urban and rural municipalities, using data envelopment analysis to generate efficiency scores. Those scores — discussed in terms of frequency and regional distribution — are then regressed on several socioeconomic variables.

The researchers find significant relationships between the efficiency scores, on the one hand, and, on the other, the proportion of students in the population under age 20 (demand indicator), the number of teachers (variable input), the percentage of the municipal budget spent on education, and the degree of urbanization.

Efficiency in the use of classrooms (in terms of classes) varies considerably among municipalities, and efficiency is highest in the capital city of Sofia. To the extent that some variation in efficiency reflects demand or demographic factors, there is little that policy can do to change the pattern. But some changes in municipal policy could increase the efficiency of classroom use without jeopardizing the fundamental learning objective. In some rural areas, for example, where there are few students and classroom utilization is low, it may be possible to consolidate several grades into multigrade classes and reduce the size of the teaching (and nonteaching) staff, while maintaining the quality of learning and maximizing the use of such fixed inputs as classrooms.

To the extent that it is possible to use such classrooms more efficiently, savings could be generated in the municipalities that need them most: in demographically sparse, poor municipalities with a weak economic base. Those savings could then be reallocated to other educational essentials, such as equipment and materials.

This paper — a product of the Country Operations Division, Europe and Central Asia, Country Department I — is part of a larger effort in the region to study social issues during the transition in South-Eastern European countries. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Faithlyn Smith, room H5-245, extension 36072 (16 pages). February 1995.

EFFICIENCY IN BULGARIA'S SCHOOLS

A NON-PARAMETRIC STUDY

by

Željko Bogetić and Sajal Chattophadyay[1]

Table of Contents:

Country Operations Division
Department for South-Eastern Europe
Europe and Central Asia Region

1/ Country Economist, World Bank, Washington D.C.(The World Bank, 1818 H Street NW, Washington D.C. 20433, U.S.), and Assistant Professor of Economics, University of Connecticut (The University of Connecticut, Department of Economics, 341 Mansfield Rd., Storrs, CT 06268). Helpful comments from Anthony Wheeler and Subhash Ray are gratefully acknowledged.

EFFICIENCY IN BULLGARI'S SCHOOLS

A NON-PARAMETRIC STUDY

Željko Bogetić and Sajal Chattophadyay

The possibility of slacks in economies where market mechanism does not govern much of the economic activity is now widely recognized. This results in significant technical as well as allocative inefficiencies in many sectors of the economy. But even in Eastern Europe, where most countries have moved to a market economy, slacks and inefficiencies inherited from the previous system persist. Therefore, it becomes critically important to identify and quantify those inefficiencies and pursue policies that will increase the efficiency of the system. This is particularly true in large and important social sectors such as education and health. Given the competing demands on tight budgets which most countries in the transition are facing, efficiency in these sectors must be increased just to maintain the level of service (e.g., access and quality of learning in primary education).

In this paper, we study technical efficiency of Bulgarian schools using a non-parametric analysis in an attempt to document the relative extent of inefficiencies in classroom use in Bulgarian municipalities. To our knowledge, there has been no such study for Bulgarian schools carried out to date. However, from both economic and policy viewpoints, such analysis is potentially useful. It can assess the technical slacks in the system of classroom use, identify the relative distance of different municipalities from the most efficient, i.e., "frontier" municipalities, and provide potentially important policy implications to reduce those slacks by better planning, use and allocation of classroom facilities within the school system in that country.

The organization of the paper is the following. Section I describes motivation and a brief background to the analysis. Section II discusses methodology employed and the data. Section III presents results of the analysis, and the final section concludes with a summary and policy implications.

I. Motivation for the Analysis

Bulgaria is a lower middle-income country with a per capita income of approximately USD 1,330 in 1993, according to the World Bank Atlas (1994). Between 1946 and 1989, it was a centrally planned economy in which almost all activities were directly or indirectly controlled by the state. This is particularly true for large social sectors such as education. The emphasis that the former system gave to building extensive education facilities across the country resulted in the considerable stock of school and classrooms in Bulgaria today, and correspondingly, a large number of teachers. On the surface, Bulgarian indicators for education appear favorable with a literacy rate of over 95% and the primary pupil-teacher ratio (15) much lower than in other countries in its income group (25).[1] Even when compared with some Eastern European countries with the similar legacy of socialism, the Bulgarian numbers appear better. In Poland and the Slovak Republic, for example, primary pupil-teacher ratios are 17 and 19, respectively. However, these data probably hide considerable slacks and inefficiencies arising from the extensive facilities and the number of teaching and non-teaching staff.

The transition to a market economy necessarily hardens the budget constraint on all sectors and economic agents: the state and state enterprises, and households. Education is no exception. In Bulgaria, total government expenditures have dropped from over 60% of GDP in 1990 to 47% in 1993 and expenditure on education has fallen proportionately. Increasing efficiency in education is thus imperative if this sector, particularly primary education, is to meet the twin objectives of *learning* and *access* under increasingly tighter budget[2]. Thus identifying and reducing technical slacks becomes particularly important.

1/ *World Development Report 1994*, Annex Table 28.

2/ World Bank (1990).

II. Methodology and Data

There is a voluminous literature which looks into the production characteristics of education sector, such as efficiency, scale and scope economies and in the context of developed countries. In most cases, inferences are based on results obtained from the estimation of a cost function (Bee and Dolton, 1985; Butler and Monk, 1985; Kumar, 1983; Scott and Santerre, 1990). An exception focussing on developing countries is a study by Jimmenez (1986) about primary and secondary education in Latin America which also involved fitting a cost function.

It should be noted that estimations of parametric production, cost or profit functions may not reveal the true characteristics of the relationships studied for several reasons. First, results depend on parametric specification and assumed distribution of the error term. Second, error terms are two-sided, meaning that these estimates imply a behavior compared to an average firm. For example, a production function fitted by regression of outputs on inputs will have both positive and negative residuals and what is estimated is *mean* output not *maximum* output (Schmidt, 1985). And third, when prices of inputs and outputs are not available or distorted, as is the case with the country we are dealing with, cost or profit function cannot be fitted.

Non-parametric frontier function approach avoids these difficulties. In this study, we apply the non-parametric method of Data Envelopment Analysis (DEA) (Charnes, Cooper and Rhodes, 1978) on the data from Bulgaria to estimate relative efficiency scores in the use of classrooms in Bulgaria's general education (first twelve grades). The efficiency scores are then regressed on a host of probable explanatory variables to examine the factors causing the efficiency differences.

Data Envelopment Analysis has been previously applied on education data by Charnes, Cooper and Rhodes (1978), Bessent *et al.* (1982, 1984) and Ray (1991). These studies use data from the United States. The first three studies include socio-economic factors in the DEA stage of analysis. Ray (1991), distinguishes the socio-economic variables as the non-discretionary inputs and use them in subsequent regression analysis to explain differences in the DEA efficiency scores. Our study differs from Ray's as we have appended an additional constraint on the weights in the linear program to account for the more general case of variable returns to scale.

We start with a brief description of the Data Envelopment Analysis methodology used in this paper. The linear programming form of the DEA problem for firm t, the Decision Making Unit (DMU), is stated as:

$$Maximize\ Z_t \tag{1}$$

subject to the inequality constraints:

$$\lambda_1 Y_{r1} + \ldots + \lambda_t Y_{rt} + \ldots + \lambda_n Y_{rn} \geq Z_t Y_{rt}; \quad r=1,\ldots,s; \tag{2}$$

and the nonnegativity conditions;

$$\lambda_1 X_{i1} + \ldots + \lambda_t X_{it} + \ldots + \lambda_n X_{in} \leq X_{it}; \quad i=1,\ldots,m; \tag{3}$$

$$\lambda_1, \ldots, \lambda_n \geq 0. \tag{4}$$

The interpretation of this linear program is straightforward. Subscripted values of Y and X denote the s outputs and m inputs, respectively, of n firms. Z_t is an output expansion factor.[3] We maximize Z_t by constructing a synthetic firm in (2), assigning weight Λ_j (perhaps zero) to the outputs of each firm j, with the stipulation in (3) that this synthetic firm should not use more of any input than currently being used by the firm t. In effect, we ask: What is the maximum value of Z_t, a

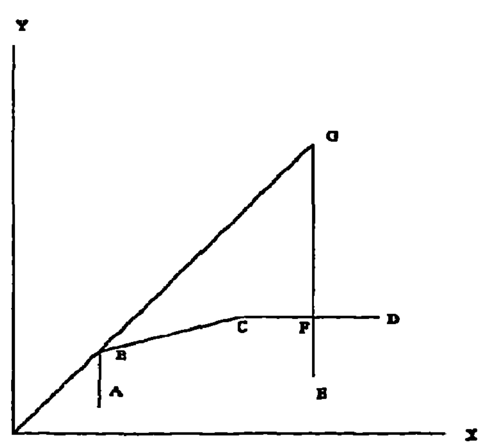
---

3/ Alternatively, the problem can be constructed to find the maximum rate of input contraction, subject to the constraint that the synthetic firm produces an output bundle no smaller than that produced by the Decision Making Unit (DMU) being investigated.

than currently being used by the firm t. In effect, we ask: What is the maximum value of Z_t, a common scale by which all outputs of firms t can be increased by this synthetic firm? While not necessarily optimal, $Z_t=1$ (i.e., no expansion) is always feasible, because $\Lambda_j=0$ for $j \neq t$ and $\Lambda_j= 1$ for $j = t$ provides a feasible solution. When Z_t^*, the optimal value of (1), exceeds unity, the synthetic firm, representing the weighted behavior of a "reference set" of firms (those for which $\Lambda_j>0$), could achieve at least the same output levels as firm t, using no more inputs than firm t. The measured efficiency of firm t is then defined as $h_t^*=1/Z_t^*$. If $Z_t^*>1$, then $h_t^*<1$ and firm t is technically inefficient relative to other firms in the sample. If $Z_t^*=1$, then $h_t^*=1$ and firm t is technically efficient, but again only in a relative sense. This linear program must be solved for each of the n firms in the sample, and it can be formally shown that only efficient firms ($h_t^*=1$) will enter into the "reference set" of any particular inefficient firm.

Unlike the previous DEA studies of education, we allow for variable returns to scale. Banker, Charnes and Cooper (1984) have added a constraint in their DEA program, where the sum of the weights (Λ_j) for a reference set of firms is equal to one. This corresponds to the more general case of variable returns to scale and provides for richer and more diverse production behavior at segments of the production surface [e.g., see Seiford and Thrall (1990).]

Figure 1. The VRS Requirement



Consider the simplest case in which each firm uses one input (X) to produce a single output

(Y). Points A, B, C, D and E represent firms in a given sample. Without the variable returns to scale (VRS) requirement, efficiency of firm E is compared to a synthetic firm G, constructed by simply expanding the present scale of B, the firm with the highest average product. Incorporating the VRS requirement restricts the synthetic firm to be a convex combination of firms A, B, C and D. Note that average product, the slope of a ray from the origin to a production point, increases from A to B (increasing returns to scale) and decreases from B to C to D (decreasing returns to scale). Efficiency of firm E is compared to the synthetic firm F rather than G. This measure is preferred when simple expansion of the high productivity firm (B) is unrealistic. In short, the Banker, Charnes and Cooper (1984) modification allows for more flexible production relationships and further benefits the firm to be evaluated.

With this methodological background in mind, we present the summary of the data on the classrooms and classes in Bulgarian municipalities. Classrooms are fixed inputs, and classes are outputs. There are no standardized tests in Bulgaria which would enable us to use a more appropriate measure of output in terms of learning (Lockheed and Hanushek, 1994). Therefore, the focus on the technical relationship between classrooms and classes should capture only one, albeit important, dimension of technical efficiency in Bulgarian general education.

The source of the data is the Bulgarian National Statistical Institute publication on general education (National Statistical Institute, 1994), supplemented by the general demographic data, and cover 199 of the total of 259 Bulgarian municipalities. The difference, 60 observations, had to be dropped from the analysis due to incomplete and/or inconsistent information.

Table 1: Summary of Data on Classes and Classrooms in Bulgaria's Municipalities

Outputs	Mean	Standard Deviation	Minimum	Maximum
Y_1 (number of total classes in towns)	123.38	198.06	8	1624
Y_2 (number of total classes in village)	64.51	49.33	1	299
Inputs				
X_1 (number of total classrooms in towns)	83.49	111.11	4	894
X_2 (number of total classrooms in villages)	70.41	55.93	1	358

The problem at hand is to explore whether it is possible to expand the number of classes in towns and villages by a common rate, subject to the constraint that the number of classrooms required, is less than or equal to the existing number of classrooms in towns and villages.

III. Results of DEA Analysis

Table 2 presents the distribution of efficiency scores. Most observations fall in the score range between 0.60 and 0.89, the total of 147 observations or 74% of the total. The total of 41 observations, or a little over 20%, has the efficiency scores of between 0.9 and 1.0. Of these, 22 observations or 11% of the total are the frontier points with highest efficiency score of 1.0. On the lower end of the distribution, we find 11 observations or 5.6% of the total.

Table 2: The Frequency Distribution of Efficiency Scores

Range	Number
1	22
0.95-0.99	9
0.90-0.94	10
0.85-0.89	35
0.80-0.84	18
0.75-0.79	35
0.70-0.74	25
0.65-0.69	21
0.60-0.64	13
0.55-0.59	5
0.50-0.54	3
0.45-0.49	2
0.40-0..44	1

Geographic or regional distribution of efficiency scores is given in Table 3. Interestingly, municipalities in the capital City Sofia display the highest mean efficiency score (0.951) relative to other regions. The distance of Sofia to other regions on the efficiency scale is not marginal. The region with the second highest score is Razgrad (0.844) in the north-east, followed by the Black Sea region of Burgas (0.807). The other five regions, Haskovo, Varna, Mihailovgrad, Plovdiv and Lovec, have similar regional efficiency scores in the range between 0.774 (Lovec) and 0.786 (Haskovo). Variation of scores within regions is fairly uniform, while the minimum scores across regions show greater variability. The City Sofia again scores favorably with the highest minimum score of 0.87, while the lowest minimum score is found in a municipality in the region of Mihailovgrad.

Table 3: Summary of Efficiency Scores by Regions

Region	Mean Efficiency	Standard Deviation	Minimum	Maximum
All 9 regions (199 observations)	0.793	0.129	0.430	1.000
City Sofia (5 observed)	0.951	0.067	0.870	1.000
Burgas (18 observed)	0.807	0.121	0.598	1.000
Varna (20 observed)	0.782	0.137	0.539	1.000
Lovec (30 observed)	0.774	0.111	0.618	1.000
Mihailovgrad (23 observed)	0.782	0.131	0.430	1.000
Plovdiv (28 observed)	0.775	0.109	0.631	1.000
Razgrad (21 observed)	0.844	0.118	0.601	1.000
Sofia (33 observed)	0.783	0.141	0.465	1.000
Haskovo (35 observed)	0.786	0.154	0.465	1.000

The question arises what determined the observed variation in efficiency scores in Bulgarian municipalities. To address that question, we use multivariate regression analysis. The choice of the explanatory variables is, obviously, partly dictated by the availability of data. Nevertheless, we were able to collect data on several variables which intuitively should be related to the efficiency of use of Bulgarian classrooms. First, the percentage of students in the population under age 20 is expected to be positively related to the use of classrooms, directly through the availability of students and indirectly through the class size. Second, the number of teachers is anticipated to be positively related with the efficiency of use of classrooms. Larger number of teachers enables larger number of classes per classroom, thus increasing efficiency in the use of classrooms. Furthermore, we wanted to explore any possible link between government's funding for general education and the efficiency scores, as there is a wide presumption that lack of funding for primary education is a serious constraint on primary education[4]. In the absence of data on spending on general education, we use as the proxy variable the percentage of municipal budgets spent on education. Finally, to explore any links between spatial characteristics of municipalities and the efficiency scores, we used two additional variables: total municipal land area in square kilometers and the percent of urbanization.

The simplest regression to test is the linear form, and we used it as the starting point for the empirical analysis.

$$E = \alpha + \beta X + \epsilon \qquad \textit{Linear} \tag{5}$$

Although efficiency scores are continuously distributed and do not suffer from the heteroskedasticity problem encountered in case of dichotomous linear probability model, the calculated value of efficiency from the regression can lie outside the admissible range (0,1). We, therefore, have also estimated a non-linear logistic regression of the following form:

$$E = \frac{1}{1 + e^{(\alpha + \beta X + \epsilon)}} \tag{6}$$

to restrict the values of the dependent variable in the (0,1) interval.

4/ See, for example, World Bank (1990) policy paper on primary education which explicitly states that in most developing countries, primary education is generally underfunded (p.43).

Table 4: Regression Results

Independent Variable	Linear	Non-Linear Logistic
Intercept	0.556048 (8.879)	-0.075294 (-0.16)
PS (percent of students in population under age 20)[5]	0.210389 (2.076)	1.334251 (1.53)
T (number of teachers)[5]	0.000159 (5.904)	0.00185395 (4.54)
ED (% of municipal budget spent on education)	0.001773 (1.673)	0.00852682 (1.47)
U (percent of urbanization)	0.000014577 (1.455)	0.00008773 (1.15)
LA (Total land area in square kilometers)	0.000062871 (1.744)	0.00014441 (0.56)
Adj. R^2	0.2388	0.2645
F value	12.356	

Note: t-statistics is in the brackets.

The explanatory variables together explain 24 percent of variation in efficiency in the linear

5/ We could not take the number of students and the number of teachers in the DEA stage, as we do not have a break up of these data between towns and villages for each municipality.

model and 26 percent in the non-linear logistic model. The proportion of students in the population under the age of 20 is significant and positive. If this proportion increases, the demand for and, therefore, the number of classes increases. The number of teachers is found to be positive and significant in both models. The rationale is that for same classrooms, the number of classes increases if the number of teachers increases. This is the same as saying that teachers are a variable input. The DEA analysis took into account fixed input only i.e., the number of classrooms. Furthermore, if a percentage of municipal budget spent on education increases, efficiency increases (statistically significant). The percentage of urbanization is also associated with higher efficiency. Typically, in regions with a greater degree of urbanization and, therefore, greater demand, classes are run more than one shift, i.e., there are greater number of classes per classroom. Hence the highly urbanized areas, such as City Sofia displays highest efficiency scores in the utilization of classrooms, as shown earlier in Table 2. Finally, the size of the land area of a municipality is positively associated with efficiency; the association is stronger in the linear model.

IV. Policy Implications

We analyzed the technical efficiency of classroom use in terms of the number of classes in Bulgarian municipalities, in both urban and rural areas, using the Data Envelopment Analysis to generate efficiency scores for each of 199 municipalities with complete data. Efficiency scores are presented in terms of frequency distribution, and geographic, regional distribution. We then regressed these efficiency scores on several socio-economic variables which intuitively could explain the observed variation in efficiency scores. Significant relationships are found between the proportion of students in the population under age 20 (demand indicator), the number of teachers (variable input), the percentage of municipal budget spent on education, and degree of urbanization. Although the regressions explain a modest amount of the total variation in efficiency scores (between 24 and

26%), they do point out to several variables of importance.

The analysis shows that there is considerable variability in the efficiency of the use of classrooms in terms of classes across Bulgarian municipalities. Regional differences are also non-marginal with the striking result that the efficiency, as defined, is highest in the capital - five municipalities of the City Sofia. Some of the variation is related to demand factors. In rural areas with lower population density there are simply less students than in urban areas, thus making the class sizes and the use of classrooms less intensive than in urban areas. There seems to be little that policy can do to alter this overall spatial pattern of demand for classes.

Yet, there maybe operational policies at the municipal level that can increase the efficiency in the use of classrooms, without jeopardizing learning objective. For example, in rural areas, the class size is often much smaller, there are fewer shifts, and classrooms are not used as much as in the cities. Consolidating several grades into multi-grade classes in such rural areas could be used to reduce the number of teaching (and non-teaching) staff in those areas, while maintaining the quality of learning, and increasing the use of fixed inputs such as classrooms. To the extent that is possible, there could be savings to tap in those municipalities which need them most: demographically sparse, poor municipalities with weak economic and human resource base. Those savings could then be reallocated to other essential services within the general education, such as teaching equipment and materials, which seem to be notoriously lacking in Bulgaria[6].

Further empirical study of efficiency in general education in Bulgaria and other Central and Eastern European countries is warranted. As these countries move towards a market economy, with the inevitable hardening of budget constraints at all levels, access to essential services such as primary education should be maintained, and quality should not be allowed to deteriorate. Until these countries move onto a sustainable growth path, it is likely that large social sectors, such as education, will be under severe pressure to use its resources more efficiently. To that end, it is necessary to

---

6/ World Bank (1994b).

identify and quantify the slacks before meaningful policy prescriptions are made. We hope that this paper is a modest contribution in that direction.

References

Bee, Malcolm and Peter J. Dolton (1985). "Cost and Economies of Scale in U.K. Private Schools", *Applied Economics*, April, 281- 290.

Banker, R., A. Charles and W. Cooper (1984). "Models for Estimating Technical and Scale Efficiency in Data Envelopment Analysis", *Management Science*, 30, 1078-1092.

Bessent, A., W. Bessent, J. Elam and D. Long (1984). "Educational Productivity Council Employees Management Science Methods to Improve Educational Quality", *Interfaces*, 14(6) November-December, 1-8.

Bessant, A., W. Bessant, J. Kennington and B. Reagan (1982). "An Application of Mathematical Programming to Assess Productivity in the Houston Independent School District", *Management Science*, 28, 1355-1367.

Butler, R.J. and David H. Monk (1985). "The Cost of Public Schooling in New York State: The Role of Scale and Efficiency in 1978-79", *The Journal of Human Resources*, Summer 1985, 361-81.

Charnes, A. W., Cooper and E. Rhodes (1978). "Measuring the Efficiency of Decision Making Units", *European Journal of Operational Research*, 2, 429-444.

Charnes, A. W., Cooper and E. Rhodes (1981). "Evaluating Program and Managerial Efficiency: An Application of Data Envelopment Analysis to Program Follow Through", *Management Science*, 27, No.6, June, 668-697.

Kumar, Ramesh C. (1983). "Economies of Scale in School Operation: Evidence from Canada", *Applied Economics*, 15, 232-340.

Lockheed, Marlaine E. and Eric Hanushek (1994). "Concepts of Educational Efficiency and Effectiveness", *World Bank Human Resources Development and Operations Policy Working Paper No.24*, March 1994.

National Statistical Institute, (1994). *General and Professional Education 1992-1993 School Year* (in Bulgarian), Sofia.

National Statistical Institute (1992), *Statistical Abstract*, Sofia.

Ray, Subhash C. (1991). "Resource-Use Efficiency in Public Schools: A Study of Connecticut Data", *Management Science*, 37, No.12, December, 1620-1628.

Schmidt, Peter (1985). "Frontier Production Functions", *Econometric Review*, 289-328.

Scott, Callan J. and Rexford E. Santerre (1990). "The Production Characteristics of Local Public Education: A Multiple Product and Input Analysis", *Southern Economic Journal*, 57, No.2, October, 468-480.

Seiford, L. and R. Thrall (1990). "Recent Developments in Data Envelopment Analysis: The Mathematical Programming Approach to Frontier Analysis", *Journal of Econometrics*, 46, 7-38.

World Bank (1990). *A World Bank Policy Paper on Primary Education*, World Bank, Washington D.C.

World Bank (1994a). *World Development Report*, World Bank, Washington D.C.

World Bank (1994b). *Bulgaria: An Economic Update*, World Bank, Washington D.C., May.

Policy Research Working Paper Series

	Title	Author	Date	Contact for paper
WPS1397	Are Private Capital Flows to Developing Countries Sustainable?	Uri Dadush Ashok Dhareshwar Ron Johannes	December 1994	J. Queen 33740
WPS1398	The Cost of Air Pollution Abatement	Raymond S. Hartman David Wheeler Manjula Singh	December 1994	E. Schaper 33457
WPS1399	How Important to India's Poor is the Urban-Rural Composition of Growth?	Martin Ravallion Gaurav Datt	December 1994	P. Cook 33902
WPS1400	Technical and Marketing Support Systems for Successful Small and Medium-Size Enterprises in Four Countries	Brian Levy with Albert Berry, Motoshige Itoh, Linsu Kim, Jeffrey Nugent, and Shujiro Urata	December 1994	D. Evans 38526
WPS1401	Colombia's Small and Medium-Size Exporters and Their Support Systems	Albert Berry Jose Escandon	December 1994	D. Evans 38526
WPS1402	Indonesia's Small and Medium-Size Exporters and Their Support Systems	Albert Berry Brian Levy	December 1994	D. Evans 38526
WPS1403	Small and Medium-Size Enterprise Support Policies in Japan	Motoshige Itoh Shujiro Urata	December 1994	D. Evans 38526
WPS1404	The Republic of Korea's Small and Medium-Size Enterprises and Their Support Systems	Linsu Kim Jeffrey B. Nugent	December 1994	D. Evans 38526
WPS1405	Growth and Poverty in Rural India	Martin Ravallion Gaurav Datt	January 1995	WDR 31393
WPS1406	Structural Breaks and Long-Run Trends in Commodity Prices	Javier León Raimundo Soto	January 1995	R. Luz 31320
WPS1407	Pakistan's Agriculture Sector: Is 3 to 4 Percent Annual Growth Sustainable?	Rashid Faruqee	January 1995	F. Willie 82262
WPS1408	Macroeconomic Management and Intergovernmental Relations in China	Jun Ma	January 1995	C. Jones 37754
WPS1409	Restructuring Uganda's Debt: The Commercial Debt Buy-Back Operation	Kapil Kapoor	January 1995	E. Spano 35538
WPS1410	Macroeconomic Effects of Terms-of-Trade Shocks: The Case of Oil-Exporting Countries	Nikola Spatafora Andrew Warner	January 1995	J. Queen 33740

Policy Research Working Paper Series

	Title	Author	Date	Contact for paper
WPS1411	Income Inequality, Welfare, and Poverty: An Illustration Using Ukrainian Data	Nanak Kakwani	January 1995	G. Evans 85783
WPS1412	Foreign Technology Imports and Economic Growth in Developing Countries	Xiaoming Zhang Heng-fu Zou	January 1995	C. Jones 37754
WPS1413	Endogenous Distortions in Product and Labor Markets	Martin Rama Guido Tabellini	January 1995	S. Fallon 38009
WPS1414	The World Bank and Legal Technical Assistance: Initial Lessons	The World Bank Legal Department	January 1995	K. Mathernová 82782
WPS1415	China's GDP in U.S. Dollars Based on Purchasing Power Parity	Ren Ruoen Chen Kai	January 1995	E. O'Rielly-Campbell 33707
WPS1416	Informal Regulation of Industrial Pollution in Developing Countries: Evidence from Indonesia	Sheoli Pargal David Wheeler	February 1995	E. Schaper 33457
WPS1417	Uncertainty and Global Warming: An Option-Pricing Approach to Policy	Andrea Baranzini Marc Chesney Jacques Morisset	February 1995	C. Dell 85148
WPS1418	The Impact of Labor Market Regulations	Lyn Squire Sethaput Suthiwart-Narueput	February 1995	G. Bayard 37460
WPS1419	Industry Structure and Regulation	Martin C. Stewart-Smith	February 1995	N. James 82758
WPS1420	Legislative Frameworks Used to Foster Petroleum Development	William T. Onorato	February 1995	W. Onorato 81611
WPS1421	Distribution of Income and the Income Tax Burden in Bulgaria	Zeljko Bogetic Fareed M. A. Hassan	February 1995	F. Smith 36072
WPS1422	Efficiency in Bulgaria's Schools: A Nonparametric Study	Zeljko Bogetic Sajal Chattophadyay	February 1995	F. Smith 36072
WPS1423	The Role of Commercial Banks in Enterprise Restructuring in Central and Eastern Europe	Millard Long Izabela Rutkowska	February 1995	R. Garner 37670