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Mexico

Earnings Inequality after Mexico's Economic and Educational Reforms

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MAIN ABBREVIATIONS & ACRONYMS

AMCM:	Metropolitan Area of Mexico City (Area Metropolitana de la Ciudad de México)
ANUIES:	National Association of Universities and Institutions of Tertiary education (Asociación Nacional de Universidades e Instituciones de Educación Superior)
CBTA:	Center of Technological Agricultural Baccalaureate (Centro de Bachillerato Tecnológico Agropecuario)
CBTIS:	Center of Technological Industrial and Services Baccalaureate (Centro de Bachillerato Tecnológico Industrial y de Servicios)
CBTF:	Center of Technological Forester Baccalaureate (Centro de Bachillerato Tecnológico Forestal)
CECYT:	Center of Scientific and Technological Studies (Centro de Estudios Científicos y Tecnológicos)
CENEVAL:	National Center of Evaluation for Tertiary Education (Centro Nacional de Evaluación para la Educación Superior A.C.)
CETAC:	Center of Technological Studies of Continental Water (Centro de Estudios Tecnológicos de Aguas Continentales)
CETIS:	Center of Technological Industrial and Services Studies (Centro de Estudios Tecnológicos Industrial y de Servicios)
CETMAR:	Center of Technological Studies of Sea (Centro de Estudios Tecnológicos del Mar)
COMIPEMS:	Metropolitan Commission of Public Institutions of Upper Secondary Education (Comisión Metropolitana de Instituciones Públicas de Educación Media Superior)
CONAPO:	National Council of Population (Consejo Nacional de Población)
CONALEP:	National College of Technical Professional Education (Colegio Nacional de Educación Profesional Técnica)
COSNET:	Council of the National System of Technological Education (Consejo del Sistema Nacional de Educación Tecnológica)
DGAIR:	General Direction of Accreditation, Incorporation and Revalidation (Dirección General de Acreditación, Incorporación y Revalidación)
DGETA:	General Direction of Technological Agricultural Education (Dirección General de Educación Tecnológica Agropecuaria)

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DGETI:	General Direction of Technological Industrial Education (Dirección General de Educación Tecnológica Industrial)
DGPPP:	General Direction of Planing, Programing and Budgeting (Dirección General de Planeación, Programación y Presupuesto)
EGCP:	General Test of Profesional Quality (Examinationen General de Calidad Profesional)
ENIGH	National Household Survey of Income and Expenditures (Encuesta Nacional de Ingresos y Gastos de los Hogares)
ENEU	National Urban Employment Survey (Encuesta Nacional de Empleo Urbano)
FOMES:	Fund for Modernize the Tertiary Education (Fondo para Modernizar la Educación Superior)
IPN:	National Polytechnic Institute (Instituto Politécnico Nacional)
ITESM:	Technological Institute of Higher Studies of Monterrey (Instituto Tecnológico de Estudios Superiores de Monterrey)
OECD:	Organization for Economic Cooperation and Development (Organización para la Cooperación y Desarrollo Económico)
PROMEP:	Program of Improvement of Professors (Programa de Mejoramiento del Profesorado)
SEIT:	Vice Ministry of Technological Research and Education (Subsecretaría de Educación e Investigación Tecnológicas)
SEP:	Ministry of Education (Secretaría de Educación Pública)
SESIC:	Vice Ministry of Tertiary education and Scientific Research (Subsecretaría de Educación Superior e Investigación Científica)
SNTE:	National Union of Education Workers (Sindicato Nacional de Trabajadores de la Educación)
UAEM:	State of Mexico Autonomous University (Universidad Autónoma del Estado de México)
UAM:	Metropolitan Autonomous University (Universidad Autónoma Metropolitana)
UECyTM:	Educational Unit of Science and Sea Technology (Unidad Educativa de Ciencia y Tecnología del Mar)
UNAM:	National Autonomous University of Mexico (Universidad Nacional Autónoma de México)

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Earnings Inequality after Mexico's Economic and Educational Reforms
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Mexico:

Earnings Distribution after Mexico's Economic and Educational Reforms

EXECUTIVE SUMMARY

This study reviews the factors and mechanisms, which have been driving inequality in Mexico particularly in terms of educational policies. More specifically, the observed expansion in earnings inequality in the recent period is examined with emphasis on the roles of education, aiming at (i) establishing an analytical framework that permits the analysis of interaction between education and labor market; (ii) examining the evolution of earnings inequality after the macro economic and educational policies followed in the 80's and 90's; (iii) exploring ways to improve the public educational resource use and allocation in the face of possible further increases in earnings inequality; and (iv) identifying specific aspects of educational public policy that have an important impact in the production of graduates.

The report consists of Volume 1 (main document), which summarizes the findings of the background papers (Volume II). A concise description of Volume I is given as follows. The first chapter relates the recent evolution in earnings inequality to the changes in the distribution of education, as well as to the way the labor market interacts with the distribution of schooling in the labor force. This chapter also examines the structure of the rates of returns to education and its impact on inequality in overall terms and with regard to formal and technical education. The second chapter focuses on the role of educational policy in the face of further increases in earnings inequality. Thus, it discusses educational distribution issues in Mexico; private educational expenditures and the determinants of school enrollment as well as the marginal willingness to pay for educational services. The final chapter examines policy aspects of upper secondary and tertiary levels of education. The issues identified are a) low educational quality from students who finish lower and upper secondary education; b) lack of information and diversity of curricula; and c) poor financial support. Concluding remarks are provided at the end of each chapter.

Achieving sustainable economic growth with a more egalitarian income distribution is at the core of Mexico's development challenge. Yet, the country does not perform well in terms of equity when compared with other Latin American countries. According to a recent study developed by the International Development Bank (1998), Mexico has the sixth most unequal total household income distribution in Latin America. In a broader international context, Mexico's ratio between the income share accruing to the 10 top percent to the bottom 40 percent of the population is higher than what is observed for other high-income countries and for the vast majority of the low income countries. Moreover, Mexico's income and earnings distribution has deteriorated in recent times, both according to the data made available by ENIGH and ENEU household surveys. The methodology includes the computations of the Gini index, Theil index and Lorenz Curves.

Income distribution became unequal from 1984 through 1996. The Gini coefficient, which is more sensitive to changes in the middle of the distribution, rises from 0.473 to 0.519. On the other hand, the Theil T index, which is extremely sensitive to changes in the upper and lower tails, went up from 0.411 in 1984 to 0.524 in 1996. Nonetheless, most of the deterioration of the total current income distribution happened in the mid-eighties (1984-1989). The early nineties displayed little variation in total current income inequality except for a small trend towards deterioration. From 1989 to 1994, the total current income share accruing to the 20% poorest decreased slightly (it went down from 3.9% to 3.8%), whereas the richest 10% were the only ones that increased theirs (by one percentage point), and therefore, those in the middle also experienced losses.

Between 1994 and 1996, there was an improvement in the income distribution, an interval of time that entailed a severe financial crisis in the Mexican economy. The 10% richest experienced relative losses (their total current income share dropped 1.6% points) and, accordingly, total current income inequality went down. The Gini coefficient came down from 0.534 in 1994 to 0.519 in 1996, whereas the drop in the Theil T was from 0.558 to 0.524.

Labor earnings is the source of income that contributes to most of the overall inequality. The Gini coefficient on earnings distribution jumped from 0.395 in 1988 to 0.442 in 1997, after reaching a peak of 0.464 in 1996. Similarly, the Theil T index went up from 0.327 in 1988 to 0.372 in 1997, with 0.474 in 1996. Another index, the $R_{10/20}$, increased from 4.48 to 6.04 over the period, reaching a maximum of 6.74 in 1996. There is a clear worsening in the earnings distribution in the present decade throughout 1996. The drop in earnings inequality from 1996 to 1997 is a surprising finding.

Among the most persuasive hypotheses to explain the deterioration in the earnings distribution is the one that points towards an increase in the rate of skill-biased technological change, whose transmission to Mexico might be facilitated by the increased openness of the economy. This hypothesis is based on the following facts. First, the worsening in the income distribution does not appear to be the result of a deterioration in the distribution of education, whereas the income profile, which is related to the returns to schooling, has become much steeper. Second, demand increases for a more educated labor force "within" the economic sectors, particularly metal products and machinery, explain the increase in their premium when compared to the demand shifts for less educated workers "between" economic sectors. And third, after 1990, conditional real earnings for workers with high school level education increased substantially, while conditional real earnings for lower educational levels remained steady up to 1994. In short, demand and supply, interacting within a context of economic modernization and globalization generated a trend toward greater wage disparity. As the Mexican economy continues to integrate globally, especially into NAFTA, technological progression will likely continue raising the premiums to education even further.

The decomposition of the Theil index indicates that education is a key variable for the understanding of income and earnings inequality in Mexico. The marginal contribution of education, i.e., the increase in the explanatory power when it is added to a model that already has the other variables, is almost equal to the joint contribution of other relevant variables such as age, economic sector, and labor market status. The gross contribution results, i.e. the explanatory power of a variable when considered alone, and the marginal contribution of education to inequality indicate that as the Mexican

economy progresses, education becomes even more important in determining the choices of sectors and occupations. This is, the marginal contribution of education by itself remains the same, but the gross contribution increases. The contribution of education to income distribution in Mexico is the second highest in Latin America, next only to Brazil. Moreover, what seems to be particularly interesting in the Mexican experience is that the significance of education has been increasing over time.

The decomposition of the *variation* in the Theil T index shows that education has the highest gross contribution to the explanation of *changes* in earnings distribution. In addition, the income effect is always the prevalent one, and the significance of changes in the distribution of education remains high even when one controls for changes in other relevant variables such as age, economic sector, region and labor market status.

The significance of education as an explanatory source for income distribution changes seems to be a common pattern in Latin American countries. Moreover, the relevance of changes in the relative earnings among groups over changes in the distribution of the labor force is also a trait shared by all countries where a similar analysis was carried out. What deserves attention in the Mexican case is the fact that the figures are well above those for other countries. In other words, the structural changes in the supply and demand for labor, which are greatly affected by the country's educational and macroeconomic policies as well as by the supply and demand interaction in the labor market, were particularly relevant to the earnings distribution.

The increase in earnings inequality, however, does not appear to be the result of a worsening in the distribution of education, whereas changes in the structure of payments of the labor force, which is related to the returns to schooling, has become much steeper. In fact, it is shown that the returns to education have increased in Mexico in recent times, especially for the higher levels of education and in the upper tail of the conditional earnings distribution.

There are two developments that could bode well for the distribution of earnings in Mexico in future years. The 1997 data suggests a possible trend towards a more evenly distribution of education and earnings across the labor force. Nevertheless, one should wait for more recent data to reinforce this preliminary evidence. The other development is that the supply of workers with higher education is increasing, which is the desired market response to the increased wage premium on higher education.

An increase in the supply of educated workers could "eventually" reduce the wage premium received by them, i.e. if the right number of tertiary school students were supplied, there would be a tendency to equalize the earnings distribution. However, inequality might go up even in the midst of egalitarian policies. In view of the long gestation periods associated with investments in education, the income-equalizing dynamic in both cases operates only in a long-term horizon.

The second part of this report identifies educational policies that can bring about equality in the short and long run. An interesting finding is that women are undoubtedly more educated than men. More educated women, at a time of greater female labor force participation, points in one direction -a relaxation of the supply constraint which has kept wage differentials high. A policy implication is to make it easier for women to work in the labor force through greater investment in early childhood care or other options, which would allow women to transform their education into productive gains for the society.

One alternative to improve worker's opportunities in the labor market is through the development of a more demand-driven, financially sustainable vocational training system with stronger links to industry and increased private sector participation, within the framework of a national system of labor competency norms and certification. Furthermore, technical education after completing basic education may be another alternative for those individuals that face both a high opportunity cost to continue formal education and need to acquire skills that enable them to participate in the job market.

The implication from the rates of returns to education and the benefit-incidence analysis is that the government should allocate more resources and improve the use of those resources in basic education. It was shown that at this level of instruction education is working to weaken the inequality.

A large share of public resources is given to tertiary level of education, which has a tendency to favor non-poor students in urban areas. *A strategy to reallocate* the public education expenditures from a higher to a lower level of instruction, in order to favor the poor groups, would have to involve the development of higher educational credit markets. That is to say, the Government's appropriate role in that context is to help overcome market failures in the financial sector, which limit the availability of long-term finance for investments in higher education. These failures can be corrected through student loan programs, or means-tested financial aid and scholarship programs for the poor students in the tertiary level.

Since the Mexican private sector is not able to finance higher education, public institutions should play a central role in this issue. This report argues that, in order to finance higher education for needy students, some targeted government financial assistance programs have to be designed. Experiences, up to this date, with existing loan schemes in some fifty industrial and developing countries have been disappointing, i.e., in some cases the programs either have had poor financial performance or are quite small in scale. Despite the poor performance of many loan programs, the experience of the Colombian and Canadian province of Quebec programs shows that it is possible to design and manage financially sustainable programs.

The financial support, provided by the government and private educational institutions of Mexico, faces three main problems: targeting, centralized regulation and small coverage. It will be important to assess the status of the current *Sonora Program* in order to compare and take into account the characteristics of successful programs.

With respect to the public educational expenditures by income strata and region, using the unit cost per student by state and educational level, the results indicate that at national level the poorest income groups receive the bulk of primary education subsidy (federal plus state expenditures). This same group, at higher levels of education receives progressively smaller subsidies and the pattern changes across regions. In the North Region, primary education is almost neutral (benefits equally all income groups) and regressive (benefits high income groups) for other levels of instruction. In the Central Region, primary schooling benefit the low income groups while lower secondary is almost neutral. Upper secondary and tertiary instruction benefit the richest income deciles. In the South Region, basic education benefits the bottom income groups, upper

secondary is neutral and tertiary education level benefits the top income groups. In Mexico City, the cumulative distribution at all levels of education, except primary, highly benefits the high income groups.

The benefit-incidence analysis assumed that the subsidy and the quality of education are the same for all income deciles. This is a strong assumption that has the tendency to minimize the distributional inequity within educational levels. In addition, this report estimates how much the parents are willing to spend on educational services for their children. Thus, the marginal willingness to pay for educational services complements the benefit-incidence analysis. Controlling for relevant individual characteristics, this methodology allow us to answer the following questions: What would an average household h with a given set of characteristics willing to spend on an individual child i with certain characteristics, if subsidized public education facilities were not available? What would the household have "saved" by sending the child to public schools instead of private schools? How large are these "savings" for various income groups? .

The results from the marginal willingness to pay methodology show that the non-poor and those in urban areas get a large share of the subsidy or "savings" from the government provision of education services. This could be explained by the following factors: (i) poor location of public educational services; (ii) distance that an individual has to travel to the nearest school; (iii) the population dispersion and lastly the opportunity cost of the children in rural areas.

Another interesting implications from the marginal willingness to pay analysis are ; ii) the valuation for private educational services is higher for the wealthy as compared to for the poor; and, iii) differences of school quality are higher in primary level. In light of these results, some natural alternatives for the government include i) to better target public educational services; ii) charge a fee for public educational services to the non-poor; and iii) increase the quality of education in basic education. The last policy recommendation is important because as it was shown, the main cause that drives inequality among people who have the same education and who work in similar occupations and sectors is the socioeconomic status. The government could help to overcome the effect of family socioeconomic status but above all to improve educational policies, which would work to reduce inequality.

On the demand side, household school enrollment and transition patterns are highly dependent on the cost of schooling, head of household's educational level, dwelling's services and household income per capita and. On the supply side, government effort greatly affects the probability of enrollment and transition. The probability of school attendance is much higher for the top 40% of the income distribution in urban areas when compared to those in the bottom 40% in rural areas. The variable government effort has a significant marginal impact which is many times larger for the 'Poor' as compared to the 'Wealthy' (in elasticity terms, this variable is more effective for the poor by a factor of 12 and by of factor of 15 in rural areas). The differential impact suggests that the goal of efficiency in terms of maximizing enrollments in secondary school level does not have a trade-off with the goals of greater equity of educational opportunity. Indeed, these findings indicate that increases in enrollment will be more readily obtained if resources are successfully targeted towards the poorer income group.

Finally, it is argued that the student's decision-making of which field to pursue at secondary and tertiary school level is clearly influenced by several factors as tastes, abilities, family background, information available, etc. Some of these factors are intrinsic to each particular student, and others can be used as policy tools in order to advise students of the best study option to take. In this regards, information available plays an important role on school completion and transition, since it allows students to make their own choice of study compatible with their particular interests and available study opportunities. Thus, insufficient effort on the part of educational institutions and the lack of information could not permit students to take their best option. Regarding the diversity on curricula, revalidation and lessening the numbers of specialties at secondary and tertiary levels should focus on contents of subjects rather than only on the course. This is so because many of the differences could be artificial, which impedes the transition from one program to another instead of providing mobility throughout the fields. On the other hand, curricula diversity could enhance student's vocational aptitudes and allow them to insert in the labor market more easily. Thus, it becomes extremely important to assess empirically the net impact of curricula diversity on education attainment and transition.

All findings discussed throughout this report and summarized here provide theoretical support to the objectives in the World Bank Group Country's assistance strategy (CAS). The objectives in the area of education are: i) Development of basic education, and increased access to these programs for the poor. ii) Support to secondary education to gradually bring Mexico to the level of other OECD countries. iii) In higher education, continue implementing a market-based program of student loans (Sonora program) to improve access to higher education, particularly for academically qualified but financially needy students, and to develop more effective, financially viable student loan institutions. iv) Improve worker's opportunities in the labor market, primarily through the development of a more demand-driven, financially sustainable vocational training system with stronger links to industry and increased private sector participation, within the framework of a national system of labor competency norms and certification.

La Distribución del Ingreso después de las Refomas Económicas y Educativas en México

Resumen Ejecutivo

22 de Marzo de 2000

México ocupa el sexto lugar en desigualdad del ingreso a nivel de hogar (y el tercero en áreas urbanas). En un contexto internacional la situación de México no es favorable, la proporción del ingreso de los individuos en el decil más alto respecto al ingreso de los cuatro deciles más bajos es mayor a lo observado en otros países con alto ingreso, así como en la mayoría de los países con bajo ingreso. Este estudio muestra que la distribución del ingreso en México empeoró en el periodo comprendido entre 1984-1997, de acuerdo a nuestros cálculos con base en la encuestas de los hogares publicadas por el INEGI. La metodología incluye el computo de los índices Gini, Theil, $R_{10/40}$ y las curvas de Lorenz.

La descomposición del índice de Theil indica que la educación es una variable clave para explicar la desigualdad del ingreso en México. La contribución marginal de la educación es decir, el incremento en el poder explicativo cuando ésta se agrega a un modelo que ya contiene otras variables, es casi igual a la contribución conjunta de otras variables relevantes como edad, sector económico, y ocupación en el mercado laboral. Los resultados de la contribución bruta es decir, el poder explicativo de una variable única, y la contribución marginal de la educación a la desigualdad indican que al avanzar la economía mexicana la educación se vuelve sumamente importante para determinar las alternativas de inserción laboral por sector y ocupación. Esto es, la contribución marginal de la educación se mantiene igual pero la contribución bruta aumenta. La contribución de la educación a la desigualdad en México es la segunda más alta en América Latina, después de Brasil. Más aún, lo que es particularmente interesante en el caso de México es que la importancia de la educación aumenta en el tiempo.

La descomposición de la variación en el índice de Theil muestra que la educación tiene la contribución bruta más alta para explicar los cambios en la distribución del ingreso. El efecto ingreso es siempre el que prevalece, y la importancia de los cambios en la distribución de la educación es alta aún cuando uno controla por cambios en otras variables relevantes como edad, sector económico, región y ocupación en el mercado laboral. La importancia de la educación para explicar los cambios en la desigualdad es común a otros países de América Latina. La relevancia del efecto ingreso sobre el efecto población es también una característica de los países donde se han realizado ejercicios similares. Sin embargo lo que merece la atención en el caso mexicano es que estos resultados mas importantes en comparación a otros países. Es decir, los cambios estructurales en la oferta y la demanda de trabajo, que se ven afectados por las políticas educativas y macroeconómicas en el país así como, por la interacción de la oferta y la demanda en el mercado laboral, fueron particularmente importantes para explicar la distribución del ingreso.

El aumento en la desigualdad del ingreso no puede atribuirse a un aumento en la desigualdad de la distribución de la educación, mientras que las brechas de ingreso relacionadas a los retornos a la educación son las que han aumentado considerablemente. Este estudio muestra que los rendimientos a la educación se han incrementado en México

en los últimos tiempos, particularmente para los niveles de educación más altos y en la parte superior de la distribución del ingreso.

La distribución del ingreso empeoró para el período de estudio 1984-1996. El coeficiente Gini, que es el más sensible a los cambios en la parte media de la distribución, aumentó de 0.473 a 0.515. El índice de Theil T, que es extremadamente sensible a cambios en los extremos de la distribución, aumentó de 0.411 en 1984 a 0.524 en 1996. Sin embargo, la mayor parte del deterioro en la distribución del ingreso total ocurrió a mediados de los 80s (1984-1989), a principios de los 90s la variación en la distribución del ingreso corriente total fue pequeña, excepto por un leve deterioro. Entre 1989 y 1994, la proporción del ingreso corriente total de los dos deciles más bajos (pobres) cayó ligeramente (pasó de 3.9% a 3.8%), mientras que el decil más alto (rico) fue el único que incrementó su participación (cerca de un punto porcentual) por tanto los grupos en la mitad de la distribución experimentaron una pérdida. Entre 1994 y 1996, hubo un mejoramiento en la distribución del ingreso, en un periodo de tiempo que comprende una crisis financiera en la economía mexicana. El 10% de la población más rico experimentó pérdidas (su participación en el ingreso corriente total cayó en 1.6%) y, por lo tanto el ingreso corriente total disminuyó. El coeficiente de Gini pasó de 0.530 en 1994 a 0.515 en 1996, mientras que el índice de Theil T varió de 0.558 a 0.524.

Los salarios laborales son la fuente de ingreso que más contribuye a la desigualdad. El coeficiente de Gini aumentó de 0.395 en 1988 a 0.442 en 1997, después de alcanzar un máximo de 0.464 en 1996. De igual manera, el índice de Theil T subió de 0.327 en 1988 a 0.372 en 1997, con 0.474 en 1996. Otro índice, el $R_{10/20}$, aumentó de 4.48 a 6.04 durante el período de análisis, alcanzando un máximo de 6.74 en 1996, es innegable el deterioro en la distribución del ingreso en la presente década. La caída en la desigualdad del ingreso de 1996 a 1997 es un resultado sorprendente aunque explicable.

Este estudio muestra que la hipótesis más factibles para explicar el deterioro en la distribución del ingreso es la que versa en un cambio tecnológico sesgado cuyo efecto en México se propagó a través de la apertura comercial. Algunos resultados que respaldan esta hipótesis son: i) el perfil de ingreso, que está relacionado a los rendimientos a la educación, se ha vuelto más pronunciado en la parte alta de la distribución. ii) Cambios en la demanda de la fuerza laboral más educada 'dentro' de los sectores económicos (sobre todo en el comerciable) explica el aumento en los retornos a la educación, en comparación con los cambios en la demanda de una fuerza de trabajo menos educada 'entre' sectores económicos. iii) Por último, después de 1990 los salarios reales condicionados de los trabajadores con nivel de educación medio y superior aumentaron substancialmente, mientras que los salarios reales condicionados de los trabajadores con un nivel educación básico permanecieron constantes hasta 1994. Por lo tanto la interacción de la demanda y oferta dentro de un contexto de modernización económica y globalización, generaron una creciente dispersión salarial.

Los resultados recientes muestran que la distribución del ingreso en México puede mejorar en los próximos años: los datos de 1997 sugieren una posible distribución más equitativa de la educación y del ingreso en el mercado laboral. Sin embargo, se necesita información más reciente para reforzar esta evidencia preliminar. El otro hecho interesante es que la oferta de trabajadores con nivel de educación medio y superior está aumentando que es la respuesta natural del mercado ante un incremento de los retornos a la educación superior. Un aumento en la oferta de trabajadores con educación media y superior podría 'eventualmente' reducir el premio salarial recibido en este nivel, siempre

y cuando el número necesario de estudiantes con educación superior se incorpore al mercado laboral, con esto habría una tendencia a mejorar la distribución salarial. Sin embargo, la desigualdad podría aumentar aún cuando las políticas para disminuir la desigualdad se implementaran, porque la inversión en educación tiene un horizonte de tiempo largo y la dinámica de igualación de los salarios en ambos casos opera sólo en el largo plazo.

La segunda parte de este estudio identifica las políticas educativas y laborales que pueden mejorar la desigualdad tanto en el corto como en el largo plazo. Un resultado interesante es que las mujeres están más educadas que los hombres, esto implica que en una época de mayor participación de las mujeres en el mercado laboral podría relajar la oferta laboral. Un resultado de política es facilitarle a la mujer incorporarse a la fuerza de trabajo a través de un mayor número de guarderías u otras opciones, que permitan a la mujer transformar su educación en una ganancia productiva para la sociedad. Otro resultado importante es que la educación técnica puede ser una alternativa para los individuos que enfrentan un alto costo de oportunidad para continuar su educación superior así como una verdadera necesidad por adquirir habilidades que les permitan participar en el mercado laboral. Especialmente, las habilidades o conocimientos adquiridos a través de la educación técnica después de haber completado el nivel secundaria es un factor clave en la formación de ingresos laborales. Sin embargo los resultados pueden ser mayores si los recursos se enfocan adecuadamente.

La implicación de las tasas de rendimiento a la educación y el análisis de incidencia es que el gobierno debe canalizar más recursos y mejorar como se enfocan éstos a la educación básica. Se demostró que este nivel de educación es un instrumento redistributivo del ingreso. Otro resultado importante es que una parte importante de los recursos públicos asignado a la educación superior tiende a favorecer a los estudiantes no pobres en áreas urbanas. Una estrategia para reasignar el gasto público en educación superior a la educación básica (esto es para favorecer a los grupos más pobres), tendría que incluir la creación de un mercado de crédito para la educación superior. El papel del gobierno es ayudar a reducir las fallas de mercado en el sector financiero, que limitan la disponibilidad de financiamiento a largo plazo para invertir en educación superior. Estas fallas, pueden ser corregidas a través de programas de préstamos a estudiantes y programas financieros dirigidos así como becas para los estudiantes pobres en nivel de educación superior.

Dado que el sector privado mexicano no puede financiar la educación superior, las instituciones públicas deberán desempeñar un papel central. Este reporte sugiere que, con el fin de financiar la educación superior para estudiantes de bajos recursos, se diseñe programas financiados por el gobierno. La experiencia hasta esta fecha, con esquemas de préstamo existentes en cerca de 50 países con alto ingreso y en desarrollo ha sido decepcionante, en algunos casos los programas han tenido un financiamiento muy limitado o son pequeños en escala. A pesar de los resultados poco favorables de muchos programas de préstamo, la experiencia de los programas en las provincias de Columbia y Quebec en Canada demuestran que es posible diseñar y manejar programas financieramente sostenibles. El estudio indica que los problemas que limitan el funcionamiento de este tipo de programas son los siguientes: objetivo claro, regulación centralizada y cobertura pequeña. En este contexto, será importante evaluar el Programa Sonora con el fin de incorporar y considerar las características de programas exitosos.

Con respecto al gasto público educativo por estrato de ingreso y región, utilizando el costo unitario por estudiante, por estado y nivel educacional; los resultados indican que a nivel nacional los grupos con bajo ingreso reciben la mayor parte del subsidio en educación primaria (el gasto federal más el estatal). Este mismo grupo, a niveles más altos de educación recibe progresivamente un menor subsidio y este patrón cambia según la región. En el norte, la educación primaria está cerca de la línea de igualdad mientras que el gasto público en educación es regresivo para otros niveles educativos. En la región central, el gasto en educación primaria está por arriba de la línea de igualdad mientras que el nivel de secundaria está muy cerca de dicha línea. El bachillerato y la educación superior benefician a los deciles de ingreso más altos. En la región sur, la educación básica es progresiva, el bachillerato está en la línea de igualdad y la educación superior está por debajo de la línea de 45 grados. En la Ciudad de México, la distribución acumulada en todos los niveles de educación, excepto la primaria, están muy por debajo de la línea de 45 grados.

El análisis de incidencia del gasto supone que el subsidio y la calidad de los servicios educativos son los mismos para todos los deciles de ingreso, esta es una suposición fuerte que tiende a minimizar la desigualdad distributiva dentro de los niveles educativos. El análisis de la valuación marginal por los servicios educativos subsana esta desventaja, esta metodología mide el efecto del aprovisionamiento de escuelas públicas por parte del gobierno en el patrón del gasto educativo de una familia promedio. Algunos de los resultados más interesantes son i) los no pobres y aquellas personas que residen en áreas urbanas reciben una mayor parte del beneficio o 'ahorro' del aprovisionamiento de servicios educativos por parte del gobierno. ii) El valor del servicio educativo privado es mayor para el rico en comparación con el pobre y iii) la diferencia en la calidad escolar es mayor en el nivel primaria. A la luz de estos resultados algunas alternativas para el gobierno serían i) Focalizar los servicios públicos educativos; ii) cobrar una cuota a los ricos por los servicios públicos educativos; iii) mejorar la calidad de los servicios públicos educativos en la educación básica. Esto es importante porque como se demostró en este estudio la principal causa de la desigualdad en individuos con la misma educación y que trabajan en ocupaciones y sectores similares es el perfil socioeconómico familiar. El gobierno no puede cambiar éste, pero puede mejorar las políticas educativas que influyen para reducir la importancia de este perfil.

Otro hecho interesante es, que las tasas de asistencia escolar para los niveles de secundaria y educación superior son bajas, especialmente para las personas pobres. Este reporte muestra que la probabilidad para asistir a la secundaria es mucho mayor para aquellos individuos que se están en los 4 deciles más altos de ingreso y que viven en zonas urbanas, en comparación con aquellos individuos que están en los 4 deciles más bajos y que viven en zonas rurales. El nivel educativo del jefe de familia, el ingreso per capita familiar y el esfuerzo del gobierno tienen todos un impacto positivo sobre la probabilidad de asistencia escolar. La variable del esfuerzo gubernamental tiene un impacto marginal significativo mayor para los pobres que para los ricos (en términos de elasticidad, esta variable es más efectiva para los pobres por un factor de 6). Esto sugiere que la meta de eficiencia en términos de maximizar la asistencia escolar para el nivel medio de educación no se contraponen con los objetivos de alcanzar una mayor equidad y oportunidad educativa. Los resultados indican que el aumento en la asistencia escolar se podría obtener si los recursos se dirigen exitosamente hacia el grupo más pobre.

INTRODUCTION

Achieving sustainable economic growth with a more egalitarian income distribution is at the core of Mexico's development challenge¹. Yet, the country does not perform well in terms of equity when compared with other Latin American countries. According to a recent study developed by the IDB (1998), Mexico has the sixth most unequal overall household income distribution (and the third worst in urban areas). In the broader international context, Mexico's ratio between the income share accruing to the 10 top percent to the bottom 40 percent of the population is higher than what is observed for the high-income countries and for the vast majority of the low-income countries (table 1). Moreover, as it will be shown later, Mexico's income and earnings distribution has deteriorated in recent times, both according to the data made available by ENIGH and ENEU household surveys.²

Table 1. Ratio of Income Share of the Highest 10 Percent to the Lowest 40 Percent Household Income Distribution

Low Income Countries ^{1/}		High Income Countries ^{1/}		Latin American Countries ^{2/}	
China	1.6	Australia	1.7	Argentina	2.8
Egypt	1.3	Belgium	1.0	Bolivia	3.6
India	1.4	Canada	1.4	Brazil	5.6
Ivory Coast	1.6	France	2.1	Chile	4.4
Kenya	4.7	Germany	1.3	Costa Rica	2.5
Madagascar	2.2	Italy	1.4	Ecuador	4.9
Nigeria	2.4	Japan	1.0	El Salvador	3.5
Pakistan	1.2	New Zealand	1.8	Mexico	4.4
Sri Lanka	1.1	Spain	1.0	Panama	4.9
Tanzania	1.7	Sweden	1.0	Paraguay	5.7
Uganda	2.0	Switzerland	1.8	Peru	2.6
Vietnam	1.5	United Kingdom	1.9	Uruguay	2.2
Zimbabwe	4.6	United States	1.6	Venezuela	2.7

Sources: ^{1/} World Development Report (1996).

^{2/} IDB (1998).

The second half of the eighties and the present decade is an especially meaningful period for the Mexican economy, as it encompasses a major structural change from a protected, public-sector driven economy, to a globally integrated private-sector-led one. This change has resulted in sizable economic growth but, besides being increasingly unequal, Mexico's income distribution seems resilient to both growth and public policy.

Mexico's growth since 1987 (albeit interrupted by a financial crisis in 1995) did little to close the gap between the rich and the poor; if anything that gap has expanded. In turn, the

¹ In the Country Assistance Strategy of the World Bank Group, for The United Mexican States, a Mexico's Development Challenge evaluation is included. This assessment takes into account the quest for socially sustainable adjustment and growth, which translates into three deeply interrelated goals: social sustainability, removal growth obstacles and maintenance of macroeconomic stability in the framework of globalization, and more effective public governance. This report is involved with the goal of social sustainability, more specifically to the point evaluated in providing better access to education for the poor.

² See annex 1 for a brief description of these surveys.

Government has increased its social expenditure³ continuously since 1988, both as proportion of GDP (from 5.7 to 8.5 percent), in real terms (by 97.3 percent), as percentage of programmable budget expenditures (from 32 to 52.5 percent), and per capita (today, some US\$363.12 per person are spent in social programs). While that expenditure may have partially cushioned the deterioration in income distribution, it has clearly fallen short of reversing it.

Most remarkably, the level, deterioration, and policy resilience of Mexico's inequality has over the past decade co-existed with very rapid progress in education attainment, both in terms of coverage and distribution of schooling.⁴ This phenomenon, which in recent years has also been observed in other developing as well as developed countries, is somewhat surprising, given the powerful equalizing properties generally attributed to education.

Various hypotheses have been advanced to explain the parallel rise in earnings inequality in developed and developing countries, among which the most persuasive ones point toward increases in the rate of skill-biased technological change. Whatever the primary cause may be, however, the resulting increase in earnings inequality presents policymakers with a difficult tradeoff in the allocation of public resources in education, especially in the advent of the educational decentralization process in Mexico.

In this context, this study will review the factors and mechanisms, which have been driving inequality in Mexico particularly in terms of educational policies. More specifically, the observed expansion in earnings inequality in the recent period is examined with emphasis on the roles of education,⁵ aiming at (i) establishing an analytical framework that permits the analysis of interaction between education and labor market; (ii) examining the evolution of earnings inequality after the macro economic and educational policies followed in the 80's and 90's; (iii) exploring ways to improve the public educational resource use and allocation in the face of possible further increases in earnings inequality; and (iv) identifying specific aspects of educational public policy that have an important impact in the production of graduates.

The report consists of Volume I, which summarizes the findings of the background papers (Volume II). A concise description of Volume I is given as follows. The first chapter relates the recent evolution in earnings inequality to the changes in the distribution of education, as well as to the way the labor market interacts with the distribution of schooling in the labor force. This chapter also examines the structure of the rates of returns to education and its impact on inequality in overall terms and with regard to formal and technical education. The second chapter focuses on the role of educational policy in the face of further increases in earnings inequality. Thus, it discusses educational distribution issues in Mexico; private educational expenditures and the determinants of school enrollment as well as the marginal willingness to pay for educational services. The final chapter examines policy aspects of upper secondary and tertiary levels of education. The issues identified are a) low educational quality from students who finish lower and upper secondary education; b) lack of information / diversity of curricula; and c) poor financial support. Concluding remarks are provided at the end of each chapter.

³ Social Expenditure includes Education, Health, Social Security, Labor, Rural and Urban Development and Basic Food Supply and Social Assistance.

⁴ De la Torre, Rodolfo, (1997).

⁵ Wages are directly related to individual characteristics and do not depend upon family structure. Besides, the acquaintance with their distribution brings one most of the way to understand the distribution of welfare in society.

Chapter 1. Earnings Inequality, Education Attainment and Rates of Return to Education⁶

The first part of this chapter relates the recent evolution in earnings inequality to the changes in the distribution of education, as well as to the way the labor market interacts with the distribution of schooling in the labor force. The second part examines the structure of the rates of returns to education and its impact on inequality both in overall terms as in what regards to technical education.

This chapter is organized as follows: Section 1 describes the evolution of total current income inequality between 1984-96, based on the ENIGHs household surveys, and using the household per capita current income as the unit of analysis. Section 2, focuses on the evolution of individual earnings inequality, using the information of the ENEU survey. Section 3, investigates how much of the earnings inequality can be explained by education, as well as other control variables, both in gross and marginal terms.⁷ Then, one takes a closer inspection at the evolution of educational attainment and distribution in recent times. Section 5, relates the changes in the distribution of education to the changes in earnings inequality. Section 6 focuses on the computations of rates of returns to education and the analysis of their evolution over a time; this section also examines the impact of technical education on earnings formation.

I. THE EVOLUTION OF TOTAL INCOME INEQUALITY

This evaluation of the evolution of income inequality in Mexico is based on the information available in the ENIGHs. The reason for doing so is that this survey captures total current income of the households, including non-monetary income, besides earnings and other sources of monetary income. The unit of analysis is the household, and the concept of income is the household per capita total current income.⁸

The main results of this evaluation are shown in table 2. It indicates that a very sizable deterioration in the income distribution has taken place between 1984 and 1996. While the poorest 20% of the population lost almost one seventh of their income share (0.6 percentage points), the richest 10% increased theirs by something close to one seventh (5.2 percentage points). Moreover, this last group was the only one that gained over that period, as not only the poorest, but also those in the middle lost in relative terms.

Looking at the results of this comparison, one can say that the 1984-1996 period in Mexico was marked by a series of regressive income transfers from almost the entire population spectrum to the richest stratum. Accordingly, the most commonly used inequality index points to a worsening in income inequality over this span of time. The Gini coefficient, which is more sensitive to changes in the middle of the distribution, rises from 0.473 in 1984 to 0.519 in 1996.

⁶ The findings presented in this chapter are based on background papers 1 and 2.

⁷ Educational attainment has not only monetary impacts, but can also affect other outcomes, which are important for the individual well being, but that are not necessarily measured in monetary terms. This study, however, will not consider the non-monetary impacts of education. An interesting methodology for the estimation of these impacts can be found in Wolfe, Barbara and Samuel Zuvekas (1997).

⁸ This means that total current income of the household divided by its number of household members. That is, we are considering the household as a unit characterized by a flow of income transfers and disregarding aspects related to equivalence scale.

On the other hand, the Theil T index, which is extremely sensitive to changes in the upper and lower tails, goes up from 0.411 in 1984 to 0.524 in 1996.

Even though the worsening of the distribution is indisputable, there are, nevertheless, two points that must be stressed. The first one is that, according to the ENIGH survey, most of the worsening of the total current income distribution happened in the mid-eighties (1984-1989). The early nineties display little variation in total current income inequality except for a small trend towards deterioration. From 1989 to 1994, the total current income share accruing to the 20% poorest decreased slightly (it went down from 3.9% to 3.8%), whereas the richest 10% were the only ones that increased theirs (by one percentage point), and, therefore, those in the middle also experienced losses.

Table 2. Lorenz Curves for Total Current Income^{1/} (accumulated income share %)

Population Share	1984	1989	1992	1994	1996
10	1.66	1.39	1.32	1.39	1.39
20	4.47	3.88	3.68	3.76	3.89
30	8.19	7.29	6.92	6.98	7.29
40	12.85	11.65	11.09	11.08	11.63
50	18.76	17.05	16.26	16.28	17.08
60	26.15	23.78	22.83	22.79	23.86
70	35.51	32.25	31.13	31.10	32.39
80	47.64	43.12	42.14	41.93	43.44
90	64.53	58.75	58.32	57.68	59.33
92	68.79	63.06	62.81	62.03	63.61
94	73.73	68.03	68.03	67.26	68.68
96	79.38	73.82	74.47	73.70	74.95
98	86.68	81.60	82.81	82.49	83.32
100	100.0	100.0	100.0	100.0	100.0
Bottom 20%	4.5	3.9	3.7	3.8	3.9
Middle 40%	21.7	19.9	19.2	19.0	20.0
Middle high 30%	38.4	35.0	35.5	34.9	35.5
Top 10%	35.5	41.3	41.7	42.3	40.7
Gini	0.473	0.519	0.529	0.534	0.519
Theil T	0.411	0.566	0.550	0.558	0.524

Source: Own calculations based on ENIGH.

^{1/} Based on household per capita income

The second fact to be emphasized is very surprising and hard to be explained: the observed improvement in the income distribution between 1994 and 1996, an interval of time that entails a severe financial crisis in the Mexican economy.⁹ Usually one would expect inequality to go up during recessive times, as it seems plausible to admit that the rich have more ways to protect their assets than the poor do, especially when it comes to labor which is basically the only asset of the poor (the *labor-hoarding* hypothesis). The fact, however, is that the 10% richest experienced relative losses (their total current income share dropped 1.6% points) and, accordingly, total current income inequality went down. The Gini coefficient came down from 0.534 in 1994 to 0.519 in 1996, whereas the drop in the Theil T was from 0.558 to 0.524. In principle, it could be argued that the richest experienced severe capital losses due to the crisis, in such a way that their total current income was affected compared to the poor. This hypothesis, however, is not supported by the data shown in table 3, as monetary income other than wages and salaries, and financial income as well, increased their share in total income in that time interim, particularly so for the urban areas. Therefore, the fall in inequality remains somewhat puzzling.

⁹ In 1994, current account deficit was 30 billion dollars, about 7 percent of GDP. The main effects of the financial crisis were i) GDP and domestic demand fell 6.2 percent and 14 percent respectively each; ii) the unemployment rate rose from 3.7 percent in 1994 to 6.2 percent in 1995; and, iii) the GDP per capita decreased 7.8 percent and workers experienced a significant reduction in their real wage, nearly 17 percent in 1995.

Table 3. Share of Total Income by Source (%)

Source	1994			1996		
	Total	Urban	Rural	Total	Urban	Rural
Monetary Current Income						
Total Labor Earnings	47.12	49.01	32.07	44.51	46.08	33.75
Property (Business) Income	16.96	16.23	22.75	17.74	17.11	22.07
Property Income and Rents	1.10	1.13	0.87	1.35	1.47	0.51
Income from cooperative firms	0.22	0.24	0.12	0.06	0.03	0.32
Monetary Transference	5.44	4.72	11.23	6.55	5.89	11.11
Other Current Income	0.64	0.67	0.36	0.69	0.66	0.91
No Monetary Current Income						
Self-Consumption	1.44	0.81	6.46	1.20	0.69	4.72
Non Monetary Payment	1.55	1.58	1.28	2.25	2.32	1.82
Gifts	5.04	4.73	7.57	6.07	5.86	7.55
Housing Imputed Rent	16.02	16.60	11.39	13.76	14.28	10.20
Financial Income	4.46	4.28	5.91	5.80	5.62	7.04
Total Income	100.00	100.00	100.00	100.00	100.00	100.00

Source: Own calculations based on ENIGH.

In table 4 the results for the Gini and Theil T are displayed for urban and rural areas using total current income. There, one can see, for both indices that inequality in rural areas was lower than in urban areas and remarkably stable until 1992. After a small decrease in 1994, it increased in 1996, contrary to the aggregate result discussed before. In light of these outcomes, it seems pertinent to state that the leading force behind the behavior of current income distribution in Mexico in the urban areas.

Table 4. Inequality Measures for Total Current Income

Year	Gini Coefficient			Theil T Index			
	National	Urban	Rural	Year	National	Urban	Rural
1984	0.473	0.442	0.448	1984	0.411	0.356	0.375
1989	0.519	0.498	0.444	1989	0.566	0.526	0.361
1992	0.529	0.498	0.434	1992	0.550	0.483	0.353
1994	0.534	0.508	0.419	1994	0.558	0.499	0.325
1996	0.519	0.493	0.452	1996	0.524	0.470	0.390

Source: Own calculations based on ENIGH.

II. THE EVOLUTION OF EARNINGS INEQUALITY

How much of total income inequality is due to earnings inequality? Table 5 presents the results of total current income inequality for each of its components: earnings¹⁰, monetary income excluding earnings, and non-monetary income by urban and rural areas.¹¹ Earnings are the source of income that contributes for most of overall inequality, being responsible for almost half of it at national level. It is clear that these figures may be affected by a possible underreporting of capital gains, but it seems valid to state that if one understands better the mechanisms that leads earnings inequality, this will be a large step towards understanding the behavior of total inequality. Besides, as long as labor is the main, if not the only asset of the poor, a better knowledge of earnings inequality is a valuable input for the assessment of poverty and welfare issues.

¹⁰ Earnings as defined in the ENIGH survey include salaries and wages, paid over-time, tips, contract workers' earnings, Christmas or New Year gifts and other gifts, and other monetary compensations (non-regular earnings). Earnings as defined in the ENEU survey include salaries and wages, self-employed workers' earnings, contract workers' earnings, and implicit firm owners' salaries, as well as non-monetary earnings.

¹¹ Although the results are shown for the Gini coefficient, these could have been obtained for the Theil T index, as both of them satisfy the six propositions listed in Shorrocks (1982).

Table 5. Decomposition of Total Current Income (Percentage Share in Overall Gini)

Income Source	Earnings	Monetary income	No monetary	TOTAL
		Excluding earnings	Current income	
National				
1984	46.0	32.9	21.0	100.0
1989	41.0	36.0	23.0	100.0
1992	42.9	31.9	25.2	100.0
1994	50.2	25.9	23.9	100.0
1996	46.7	29.4	23.9	100.0
Urban				
1984	45.6	32.2	22.2	100.0
1989	38.6	37.3	24.1	100.0
1992	41.4	33.1	25.5	100.0
1994	50.0	26.0	24.0	100.0
1996	46.1	29.8	24.1	100.0
Rural				
1984	30.7	49.5	19.8	100.0
1989	35.7	43.5	20.8	100.0
1992	29.6	42.2	28.2	100.0
1994	31.9	43.8	24.2	100.0
1996	35.7	41.2	23.1	100.0
1996	35.7	41.2	23.1	100.0

Source: Own calculations based on ENIGH.

To examine the behavior of earnings distribution in recent times the household survey ENEU and ENIGH were used¹². The main reasons for presenting in this volume the results based on ENEU¹³ are that its sample size is bigger than the ENIGH survey and it has richer information about personal attributes and other economic variables, which are essential for the decomposition exercises to be carried out in the next sections. This survey is collected quarterly. For the purposes of this study the third quarter of each year was chosen, in an attempt to avoid the influence of seasonal factors that could make results non-comparable to those obtained from ENIGH.¹⁴

By examining the results shown on table 6, one also reaches the conclusion that the distribution of earnings has become more unequal in recent times. The Gini coefficient jumps from 0.395 in 1988 to 0.442 in 1997, after reaching a peak in 1996 of 0.464. Similarly, the Theil T index went up from 0.327 in 1988 to 0.372 in 1997, with 0.474 in 1996. Another index, the $R_{10/20}$,¹⁵ increased from 4.48 to 6.04 over the period, reaching a maximum of 6.74 in 1996.

Table 6. Inequality Indices for the Distribution of Earnings (1988-1997)

Population Share (%)	Earnings Share (%)									
	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Bottom 20%	7.54	7.62	7.19	6.84	6.47	6.13	5.98	5.91	5.72	5.95
Middle 40%	25.23	24.45	23.86	23.41	23.37	22.86	22.36	22.59	22.09	23.01
MHigh 30%	33.44	34.15	33.96	33.77	33.52	33.37	32.94	33.42	33.61	35.13
Top 10%	33.78	33.78	34.98	35.98	36.64	37.63	38.72	38.08	38.58	35.91
Gini	0.395	0.398	0.414	0.426	0.434	0.447	0.458	0.455	0.464	0.442
Theil T	0.327	0.328	0.350	0.380	0.396	0.414	0.470	0.427	0.474	0.372
$R_{10/20}$	4.48	4.43	4.87	5.26	5.66	6.14	6.47	6.44	6.74	6.04

Source: Own calculations based on ENEU (3rd quarter).

¹² The results based on ENIGH are provided in background paper #1.

¹³ For seeing the impact of the ENEU's geographic coverage change on the results inferred, refer to annex 1.

¹⁴ In order to reduce the heterogeneity of the sample and also aspects related to self selection, the population under analysis are individuals living in urban areas, between 16 and 65 years old, working 20 hours a week or more and no seasonal workers. Also, the two highest observations were dropped from the sample, as there was clear evidence of the presence of outliers in some years.

¹⁵ This index is the ratio of the income share accruing to the 10% richest and 20% to the poorest.

There are two main differences in the pattern shown by the earnings and total current income distribution. First, the gains are not limited to the richest 10%. As those in the seventh, eighth, and nine tenths of the distribution also improved their relative earnings over the period by almost two percentage points; the biggest losers were the middle 40%, who lost more than two percentage points of their income share. Second, there is a clear worsening in the earnings distribution in the present decade throughout 1996. On the other hand, the inequality associated with the total current income was moderately stable in the nineties, displaying an improvement in 1996.

The different behavior between total current income and earnings inequalities from 1994 to 1996 gives support to the idea that the poor, who mostly rely on labor as a source of income, were the least able to protect themselves during the recession. However, the substantial drop in earnings inequality from 1996 to 1997¹⁶ is, once more, a surprising finding. It is true that the Mexican economy as a whole had a strong and impressive performance in 1997. The aggregate growth rate was around 7%, real investment grew by 24% and exports by 17%, industrial production increased 9.7%, and the civil construction sector, which is highly intensive in less skilled labor, experienced a growth close to 11%. Under such a scenario, an improvement in distribution of earnings itself is not unlikely, but the magnitude and quickness of the recovery calls for a detailed inspection of the mechanisms responsible for it.

Three broad hypotheses are frequently advanced to explain the similar increases in earnings inequality experienced in Mexico and other countries.¹⁷ These link the increase of earnings inequality to (i) the increased openness of the economy, (ii) institutional changes in the labor market, and (iii) skill-biased technological change. We will only outline here the first and third hypotheses (for details see background paper 1).

The first of these hypotheses argues that as trade barriers are reduced, an economy is placed under increased competitive pressures to specialize along its lines of comparative advantage. A developed country that is relatively high skill-abundant, like the United States, will be induced to specialize in high skill- or education-intensive activities as its low-skilled industries come under increased competitive pressure from low skill-abundant, low-wage countries.

Hanson and Harrison (1995) examined the impact of the Mexican trade reform on the structure of wages using information at firm level. They tested whether trade reform had shifted employment toward industries that are relatively intensive in the use of skilled labor force [the Stolper-Samuelson-Type (SST) effect]. Their main conclusion is that the wage gap is associated to changes within industries and firms, which cannot be explained by the SST effect. Thus, the increase in wage inequality should be due to other factors.¹⁸ Hanson's (1997) paper examines a trade theory based on increasing returns, which has important implications for regional economies. Hanson's conclusion is that employment and wage patterns are consistent with the idea that access to market is important for industry location.

This first hypothesis has several problems when applied to the United States, and becomes even less persuasive when applied to Mexico. Mexico greatly liberalized its trade regime since 1984. However, the reduction of its trade barriers has mostly been vis-à-vis imports from the developed countries, notably the United States and Canada, whose share in total Mexican merchandise imports increased from 68 percent in 1985 to 73 percent in 1993 and to 77.5 percent in 1996. Since Mexico is a low skill-abundant country compared to its two northern neighbors, it would be expected that the liberalization of trade would have induced a specialization pattern that would raise the relative demand (and hence wages) for the lesser-educated members of the labor force. This did not happen. Instead, the increase in earnings inequality observed in Mexico follow

¹⁶ The $R_{10/20}$ index, for instance, was 6.74 in 1996 and went down to 6.04 in 1997.

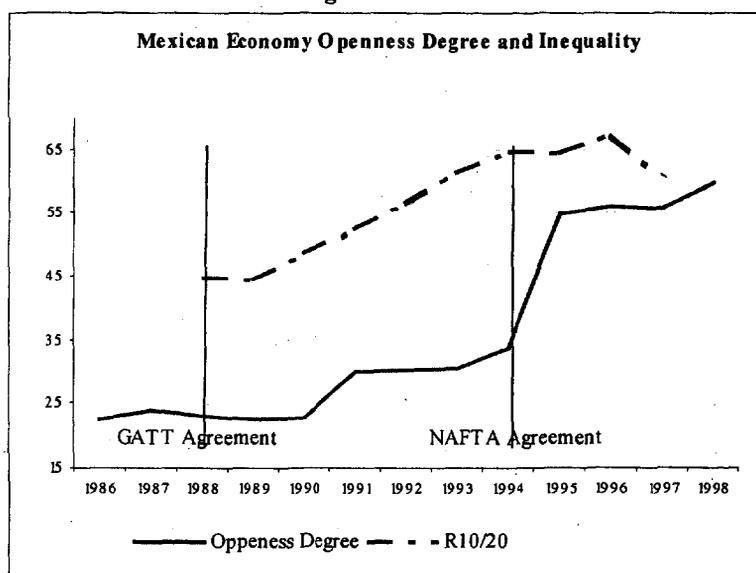
¹⁷ See, for example, the "Symposium on Wage Inequality" (1997) and the "Symposium on How International Exchange, Technology and Institutions Affect Workers" (1997).

¹⁸ The Stolper-Samuelson effect was also examined under NAFTA in Burfisher, Mary E., Robinson, Sherman, and Thierfelder (1993).

the same pattern as that observed in the United States: less educated workers experienced real wage declines, while highly educated workers experienced real wage improvements. The trade-based explanation may still be relevant, however, to the extent that greater openness facilitates the transfer of ideas and technology, which is identified below as the more persuasive explanation of increase in earnings inequality. A variant on the globalization/technology nexus explanation, advanced by Feenstra and Hanson (1994), involves outsourcing behavior where multinational enterprises in the developed country relocate their lower skill-intensive activities to the less skill-abundant developed countries. However, what is referred to as a low skilled activity in the United States may be a high-skilled activity in Mexico, which could explain the similar evolution of earnings inequality in both countries.

A persuasive explanation, both for the United States and Mexico, seems to be one which links earnings inequality to skill-biased technological changes that raise the relative demand for higher-skilled labor. Cragg and Epelbaum (1996) examined the shift demand in Mexico. They pointed out that the major source of rising inequality is a biased shift demand rather than a uniform demand growth when there are different labor supply elasticities. Meza (1998) also investigated demand shifts. The author's hypothesis is that the demand shifts for more educated labor force, "within" economic sector, explains the increase in their premium when compared to the demand shift for less educated workers "between" economic sector. Tan and Batra (1997) studied the skill-biased technical change hypothesis as a plausible explanation of wage inequality using data at the firm level for Colombia, Mexico, and Taiwan. They obtained the following results: (i) firm investments in technology have the largest impact on wage size distribution for skilled workers. (ii) It had the smallest impact on wages paid to unskilled workers. And (iii) a decomposition of wage effects by sources of technology revealed that wage premiums paid to skilled workers are led primarily by firm investment in R&D and training. Such conclusions seem to support the skilled-biased technological change hypothesis.¹⁹ According to the typology used by Johnson (1997), the type of technological change that drives wages up for the more highly skilled workers and drives wages down for the less skilled workers (as occurred in both the United States and Mexico) is extensive skill-biased technological change. Under this type of technological change, skilled workers become more efficient in jobs that were traditionally performed by unskilled workers.

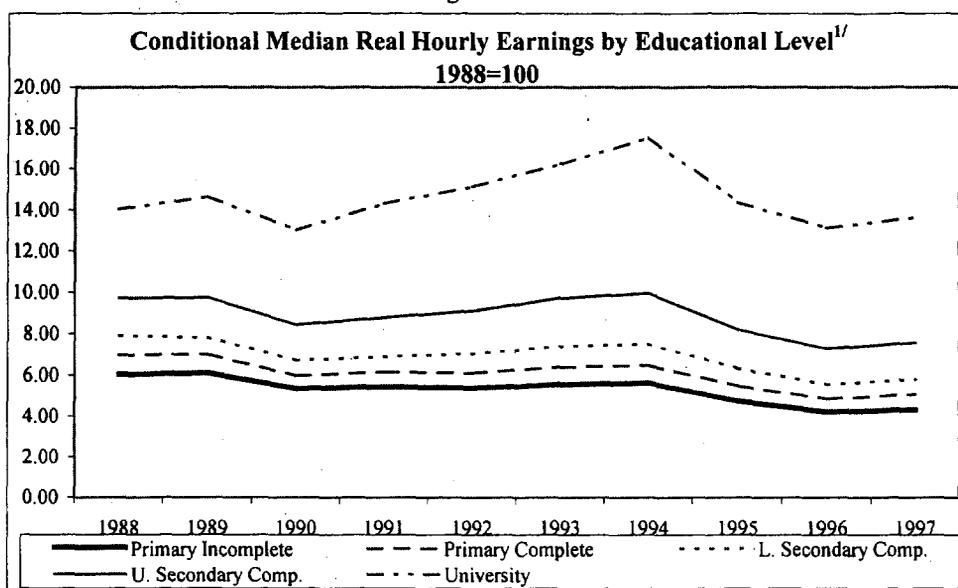
Figure 1a



Source: Own calculations based on ENIGH and INEGI data

¹⁹ Note that these results should be considered carefully, since the analysis is based on data at the firm level and just for the manufacturing industry.

Figure 1b



Source: Own estimations based on ENEU survey.

1/ The medians were calculated conditional on experience, experience squared, gender, economic sector, labor market status, and region.

As it is shown in figure 1b²⁰, all series have the same trend for all period. However, from 1990 conditional real earnings for University increased substantially, while conditional real earnings for lower educational levels remained steady up to 1994. The drastic fall in earnings in 1995 is mainly due to the crisis. After that, it seems that the earnings differentials among all educational levels remained constant²¹. This suggests that other factors rather than supply of new basic education comers drove earnings differentials among level of schooling.

In sum, demand and supply, interacting within a context of economic modernization and globalization generate the trend towards greater earnings disparity. It should be noted however that none of these explanations deal explicitly with the changes in the distribution of education, as well as the interaction between the educational policies that induced them and the workings of the labor market.

III. STATIC DECOMPOSITION

This section aims at evaluating the contribution to earnings inequality in Mexico of a set of variables, either related to individual attributes, as schooling and age, or form of participation in the labor market, as number of hours worked or status, for selected years from 1988 to 1997. The idea is to measure the reduction in inequality that results from excluding the differences in average earnings among workers in different groups formed by those variables. When the exercise is conducted for a single variable, this reduction is said to be the *gross contribution* of such a variable to the overall earnings inequality. When a variable is added to a model that contains all the remaining ones, the change in the gross contribution of these two models is called the *marginal contribution* of the added variable. In other words, the gross contribution can be regarded as the uncontrolled explanatory power of a given variable, and the marginal contribution as its explanatory power controlled by a set of other seemingly relevant variables.

²⁰ Median real hourly earnings were estimated using quantile regression models ($\theta=0.5$) and conditioned on experience, gender, labor market status, economic sector and region (see annex 1 for groups definition).

²¹ Section VI provides an extensive analysis about educational earnings differentials using the rate of returns to education

Background paper 1 reviews all the different decomposition methods and results generated in the Mexican case.

Before proceeding to the decomposition exercise, it is worth to review the conclusions of other recent studies in relation to the evolution of earnings inequality and some variables that are important in the process of earnings formation.

Cragg and Epelbaum (1996) show that both average wage and education skill premium, which is defined as the percentage increase in wages over the primary schooling group, have increased substantially for more educated workers. In other words, the higher the level of education the larger the increase in the average wage is, which in turn leads to an increase in inequality. They also examined whether the high demand for skilled labor is industry specific, task specific or simply general education. In order to assess the marginal contribution of other factors that are not related to education, these factors are controlled by a set of dummy variables that describe the industry and task specific effects. The authors concluded that the industry-specific effect was small and that the task-specific effect (occupational variable) explained half of the growing wage dispersion from 1987 to 1993. This conclusion, however, may not be correct, as occupation might be considered an endogenous variable, which is determined by education. As shown on background paper 1, educational level and occupational variables are highly correlated. In contrast, the correlation between education and other variables are low. Hence the occupation variable should be carefully handled in any kind of analysis.

The results for the exercise of static decomposition are shown on table 7.²² Education (the result of the interaction between demand and supply) is by far the variable that accounts for the largest share of earnings inequality in Mexico, both in terms of its gross and marginal contributions. The gross contribution, i.e., its explanatory power when it is considered alone, amounts to one fifth of total inequality in 1988 and one third in 1997.²³ The marginal contribution, i.e., the increase in the explanatory power when it is added to a model that already has the other variables, is remarkably stable and meaningful, staying around 21% throughout the whole period. It is worth pointing out that the difference between the two contributions has been increasing over time, indicating that the degree of correlation and other variables has been going up, i.e., the “indirect” effects are becoming more important.

Table 7. Contribution to the Explanation of Earnings Inequality (%)

Variables	1988		1992		1996		1997	
	Gross	Marginal	Gross	Marginal	Gross	Marginal	Gross	Marginal
Education	20.2	20.8	26.9	21.6	29.3	21.2	32.6	21.2
Age	5.4	8.3	7.2	6.1	6.6	6.2	7.3	5.4
Economic Sector	2.3	8.1	4.0	5.2	6.8	5.2	8.6	4.4
Status	12.8	11.2	13.7	8.9	13.7	7.4	15.6	7.5

Source: Own calculations based on ENEU (3rd quarter).

The other variables considered seem to be much less important. The three of them, and particularly the economic sector and status in the labor market, display an upward trend in their gross contribution, and a declining one in their marginal contribution. This can be interpreted as evidence that the interaction between these variables and education has become more intense.

²² Since this exercise is very intensive in the number of observations (which constitutes its main handicap) the variable “hours worked” was dropped in order to avoid the problems with cells with too few observations. The decision was made through the comparison among different combinations of variables, where hours worked ended up being the least relevant.

²³ In most earnings equations for any country, the set of measure observable variables explains at most 60% of the total variance. In United States, education accounts for 10% of the total variance (see David Lam and Deborah Levison).

That is, workers' skills are becoming increasingly more relevant towards the determination of their type of participation in the labor market, as well as for their position across different economical segments of the economy.

The analysis of these results leads to the conclusion that education is a key variable for the understanding of earnings inequality in Mexico.²⁴ Even though this is to some extent a remarkable finding, it comes as no surprise in the Latin American context. The results for some countries in the region, where similar exercises were carried out, are reported on table 8. Mexico stays on the average range for Latin American countries, and displays a situation close to that observed in Colombia and Peru. However, education seems to be more important for inequality in Brazil, and much less important in Argentina and Uruguay. It is important to stress the fact that this is a comparison in relative terms. Given that in Colombia and Peru, where education has a similar explanatory power, there is a lower degree of inequality compared to Mexico, the absolute contribution of education is higher in Mexico. As a matter of fact, in absolute terms, the contribution of education to inequality in Mexico is the second highest in Latin America, next only to Brazil. Moreover, what seems to be particularly interesting in the Mexican experience is the fact that the significance of education has been increasing over time. Therefore, the inspection of the evolution of the educational distribution and the income profile associated to it, as well the link between changes in this distribution and changes in earnings inequality will be addressed in the next sections.

Table 8. Contribution of Education to Earnings Inequality. International Comparison

Country	Author(s)	Period	Gross Contribution (%)
Latin America	Altimir and Piñera (1982)	1966/74	17-38
Argentina	Fiszbein (1991)	1974/88	16-24
Brazil	Ramos and Trindade (1992)	1977/89	30-36
	Vieira (1998)	1992/96	30-35
Colombia	Reyes (1988)	1976/86	29-35
	Moreno (1989)	1976/88	26-35
Costa Rica	Psacharopoulos et al. (1992)	1981/89	23-26
Peru	Rodríguez (1991)	1970/84	21-34
Uruguay	Psacharopoulos et al. (1992)	1981/89	10-13
Venezuela	Psacharopoulos et al. (1992)	1981/89	23-26

IV. THE EVOLUTION OF EDUCATIONAL ATTAINMENT

Education attainment levels increased rapidly in most developing countries since the 1950s Schultz (1988). While Mexico also partook in that development, earlier studies had identified a significant lag in its education indicators. Londoño (1996) for example, points to an "education deficit", according to Latin American countries in general, and Mexico in particular, have approximately two years less of education than would be expected for their level of development.²⁵ Elias (1992) found that education was the most important source of labor quality improvement in Latin America between 1950 and 1970, but points out that such improvements did not take place to the same extent in Mexico as in other countries in the region. This changed

²⁴ Additional evidence is that the explanatory power of the complete model was 42.5% in 1988, 45.0% in 1992, 45.5 in 1996, and 48.3% in 1997. This means that the marginal contribution of education is almost equal to the joint contribution of age, economic sector, and status in the labor market. The same pattern holds when hours worked, instead of sector, is considered.

²⁵ On the other hand, Behrman (1987) classifies Mexico as an overachiever in what comes to the relation between economic development and educational progresses in the context of developing countries.

dramatically in the 1980s, figure 2 in background paper 1 shows that although Mexico's education attainment increased steadily since the 70's, it continued to remain below the international trend line. In the 1980s, however, the growth of education attainment in Mexico accelerated, permitting it to catch up with international standards by 1990; where its placement in figure 2 is slightly above the trend line.

The closure of Mexico's education gap vis-à-vis the rest of the world was hastened in part by the country's economic stagnation. Mexico's real GDP per capita in the mid-1990s was roughly the same as it had been in the first half of the 1980s. Nevertheless, the preceding observation should not detract from the remarkable increase in schooling that occurred during the 1980s. While the level of average schooling in Mexico increased by roughly one year per decade during 1960-1980 (from 2.76 to 4.77 years), it increased by two years in the 1980-1990 decade. The acceleration in schooling during the 1980s, in turn, was the product of concerted efforts to increase basic education coverage combined with advances made in the reduction of primary school repetition and dropout rates.

With respect to changes in the distribution of schooling by socioeconomic groups, there are several aspects to be considered. In particular, three of them are examined here: the changes in this distribution related to gender, economic sector and age.

Table 9 shows the schooling distribution by gender from 1988 to 1997 (See background paper 1 for the evolution of the labor force participation by gender). There one can see that, even though there were clear improvements for both males and females, which translates in an upgrade of educational attainment, women achieved a better performance during that period, especially at the top of the distribution. Improvements for males, on the other hand, were more evenly spread over the entire distribution. Nevertheless, in 1997 it is possible to state that women were undoubtedly more educated than men, as their cumulative distribution dominates that of men.²⁶

Table 9. Evolution of Education Distribution by Gender (%)

Educational Group	Primary Incomplete	Primary Complete	Lower Secon. Complete	Upper Secon. Complete	University Complete
1988					
Male	19.0	30.1	24.5	14.6	11.8
Female	17.3	22.2	23.2	29.1	8.2
Total	18.5	27.7	24.1	18.9	10.7
1997					
Male	13.0	25.7	28.4	18.0	14.9
Female	12.2	20.0	22.3	30.1	15.5
Total	12.7	23.7	26.3	22.1	15.1

Source: Own calculations based on the ENEU (3rd quarter).

With respect to the distribution of schooling by economic sector, table 10 shows that there has been a significant upgrade from 1988 to 1997. Three points, nonetheless, deserve to be stressed. First, financial and social services industries became relatively more intensive in the use of high-skilled labor. Second, the primary sector, together with non-manufacturing industry and other services, were characterized by more intensive use of low-skilled labor. Third, in a surprising way, the manufacturing industry, in contrast to what seems to be the common wisdom, cannot be characterized as a sector that intensively uses high-skilled labor. *Using transition probabilities, the evolution of educational composition by economic sector is analyzed in background paper 2 in order to assess changes "between" and "within" economic sectors.*

²⁶ This remark is true for the 1997 overall distribution relative to the 1988 one.

Table 10. Evolution of Educational Distribution by Economic Sector (%)

Educational Group	Primary Incomplete	Primary Complete	Lower Secun. Complete	Upper Secun. Complete	University Complete
1988					
Primary Sector	41.1	21.0	13.3	14.3	10.3
Manufacturing Industry	16.2	33.3	27.8	14.7	8.0
Non Manufacturing Industry	36.6	28.5	14.7	9.0	11.2
Commerce	18.0	28.7	28.8	18.7	5.8
Finance Services/Rent	4.8	6.1	19.5	47.1	22.5
Transportation/communication	14.4	35.7	26.0	18.9	5.0
Social Services	11.3	17.6	21.7	28.2	21.2
Other Services	32.8	36.6	20.2	8.1	2.3
Total	18.5	27.7	24.1	18.9	10.7
1997					
Primary Sector	28.1	27.4	17.7	10.9	15.9
Manufacturing Industry	11.0	29.5	32.7	18.2	8.7
Non Manufacturing Industry	28.6	31.7	18.4	10.0	11.4
Commerce	12.4	23.4	30.6	24.1	9.5
Finance Services/Rent	2.7	5.4	16.1	40.3	35.6
Transportation/communication	9.1	26.8	32.2	23.9	8.0
Social Services	6.0	13.2	21.1	29.6	30.0
Other Services	26.2	35.7	24.6	11.1	2.4
Total	12.7	23.7	26.3	22.1	15.1

Source: Own calculations based on the ENEU (3rd quarter)

Another relevant observation is that the age groups also experienced upgrades in their education attainment, as the distribution by educational level in 1997 is above the one in 1988 (table 11). In an attempt to reach a better understanding of this event, it is interesting to contrast the time and cohort effects²⁷. In order to do this, one can look at the first age groups, 14-25 and 26-34, like synthetic cohorts. Namely, the 26-34 age group in 1997 can be directly compared to the 16-25 in 1988, and, in to a lesser extent, the 35-49 in 1997 to the 26-34 in 1988. From 1988 to 1997 the percentage of those in the primary incomplete level decreased, this reduction was higher than that experienced by the 16-25 age group (later being the 26-34 in 1997). The opposite took place for the highest level of instruction. In other words, it seems that the improvements throughout the educational process in Mexico are significant, both for those entering the system (higher coverage) and for those already in there (higher efficiency).

Table 11. Evolution of Educational Distribution by Age Groups (%)

Educational Group	Primary Incomplete	Primary Complete	Lower Secun. Complete	Upper Secun. Complete	University Complete
1988					
16-25	8.5	26.5	36.7	23.7	4.6
26-34	12.6	23.7	23.1	22.5	18.2
35-49	24.0	33.3	16.8	14.3	11.6
50-65	46.1	27.2	9.9	9.0	7.8
Total	18.5	27.7	24.1	18.9	10.7
1997					
16-25	5.8	23.8	38.7	25.5	6.2
26-34	6.9	19.5	28.1	27.0	18.5
35-49	14.8	25.8	19.5	19.1	20.7
50-65	37.3	27.6	11.5	10.6	13.0
Total	12.7	23.7	26.3	22.1	15.1

Source: Own calculations based on the ENEU (3rd quarter).

²⁷ The time effect refers to the comparison of the same age group in two different points of time.

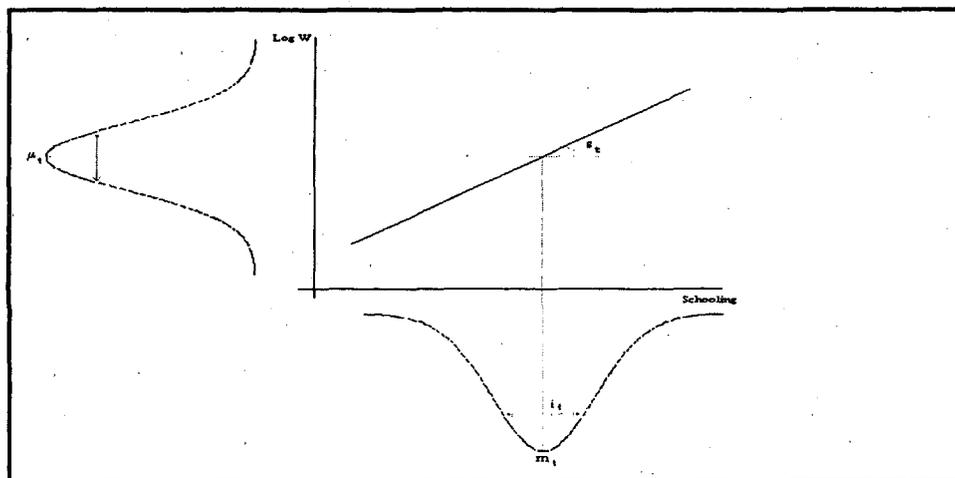
Also concerning the interaction between age and education, one can argue that the effect of developments in the educational system is more important for the new generations than for the elderly. To investigate this, it is necessary to contrast the behavior of inequality between different age groups to that of inequality within synthetic cohorts and in relation to education. As seen above, the younger cohorts are in fact better educated. At the same time the “within” income dispersion for the youngest cohorts seems to increase over time, compared to the internal Theil in 1997 and 1988. Thus, it becomes easier to understand why the gross contribution of age to inequality has been going up and at the same time its marginal contribution has been decreasing. In other words, differences in both educational attainment and distribution among cohorts have become pronounced in recent times, leading to a higher correlation (negative) between education and age.

V. THE DYNAMIC DECOMPOSITION²⁸

In order to address the relationship between education (the result of the interaction between supply and demand) and earnings inequality it is necessary to explain the role of the labor market, since the way it works determines the earnings differentials among workers with different educational attributes. Thus, this relationship can be viewed as being determined by two elements: (i) the distribution of education itself; and (ii) the way the labor market rewards educational attainment. The first element reflects a pre-existing social stratification that already entails some inequality, due to reasons other than the workings of the labor market itself. The second is associated to the degree of growth of this pre-existing inequality into earnings inequality due to the performance of the labor market (i.e. demand behavior).

The diagram below shows the distribution of education in the horizontal axis (m_t is an indicator of the average schooling of the labor force and i_t represents its dispersion) while the vertical axis has the distribution of earnings. The first quadrant depicts the interaction between the pre-existing conditions (the distribution of education) and the workings of the labor market, through the steepness s_t of the income profile related to education. Therefore, at a point of time: (i) the higher m_t is, the larger the average earning will be; (ii) the lower i_t is, the smaller the earnings inequality will be; and (iii) the higher s_t is, the bigger the growth of pre-existing disparities, and, accordingly, the higher the earnings inequality will be. As these indicators change over the time, there are going to be alterations in the income distribution induced by them: changes in i_t , assuming s_t constant, will change earnings inequality due to changes in the composition of the labor force (the so-called allocation/population effect), whereas changes in s_t will produce alterations in the earnings differentials (the income effect).

Figure 2: An Stylized View of the Interaction Between Education and the Labor Market



²⁸ The results are based on the methodology described in Background paper #1.

Barros and Reis (1991) developed three synthetic measures for the indicators m_i (average schooling), i_i (schooling inequality), and s_i (income profile), based directly on the definition of the Theil T index. The figures for Mexico from 1988 to 1997 are presented in the table below. As it can be seen, there was some improvement on average schooling, but the inequality of the distribution of education has deteriorated over the period studied, whereas the income profile, which is related to the returns to schooling, has become much steeper. Meaning that, there was a shift in demand towards high skilled labor that was not met by the increase in supply probably due to the increased rate of skill-biased technological change, whose transmission to Mexico may be facilitated by the increased openness of the economy (this is explored in the next section). The same pattern observed for the overall sample holds for the 16-25 years old age group: the m_i goes up from 0.561 to 0.574 in 1988 through 1997; the i_i increases from 0.0196 to 0.0218, whereas the s_i doubles going from 0.0196 to 0.0383.

Table 12. Synthetic Indicators of Schooling Distribution and Income Profile

Year	1988	1992	1996	1997
m_i	0.476	0.491	0.511	0.510
i_i	0.066	0.069	0.076	0.075
s_i	0.066	0.102	0.122	0.111

Source: Own calculations based on the ENEU (3rd quarter).

The methodology applied here is the dynamic decomposition. This tool permits translating this stylized view in quantitative results, giving one a better understanding of the socio-economic transformations responsible for changes in the earnings distribution. Besides permitting the identification of the relevant individual variables, it also helps understand the nature of their contribution for the evolution of earnings inequality over time.

The results of the decomposition of the variations in the Theil T index for different intervals of time are shown in the table below. The first point to highlight is the fact that, when the variables are considered alone, education has the highest gross contribution to the explanation of changes in earnings distribution. Secondly, both changes in the distribution of education (the allocation effect) and the changes in the relative earnings among educational groups (the income effect) were positive in all periods. This means that the changes in the distribution of education and in the relative earnings among educational groups were always in phase with the alterations in the earnings distribution. Namely, when the income profile related to education became steeper and the inequality of education increased, the earnings distribution worsened (as in the 1988-1992, 1992-1996, and 1988-1997 periods), and vice-versa (as in the 1996-1997 period).

Third, the income effect is always the prevalent one. If one considers, for instance, the 1988-1997 period, the changes in the relative earnings among educational groups alone, would have generated a deterioration in the earnings distribution higher than the one observed. To lesser extent, the same holds true for the other periods.²⁹ Even the decrease in inequality observed between 1996 and 1997 is partially explained by the changes in relative earnings (it is possible to see, in table 12, that the income profile related to education became less steep in this period). Therefore, it seems reasonable to conclude that the income effect is the leading force underlying the increase in inequality, and that, in turn, suggests that the workings of the labor market, and its interaction with the educational policies, should be thoroughly examined.

Fourth, it is worth pointing out that the significance of changes in the distribution of education remains high even when one controls for changes in other relevant variables. As a matter of fact, with the exception of the 1996-1997 transitional period, the marginal contribution of age, economic sector and status in the labor market are usually negative. This means that the changes in these variables contributed to reduce the effects induced by changes related to

²⁹ Of course the explanation for such a phenomenon is that the changes in the other variables worked in the direction of attenuating the changes in the rewards to education.

education, as most of the time they work in the direction of reducing inequality after the influence of education is accounted for.

Table 13. Results of the Dynamic Decomposition

Period	Variable	Allocation	Income	Gross	Marginal
1988-1992	Education	11.4	58.8	70.2	30.5
	Age	-1.8	21.9	20.2	-5.2
	Sector	-0.6	7.8	7.1	-17.7
	Status	3.9	15.1	19.0	-7.4
1992-1996	Education	23.9	32.8	56.7	27.6
	Age	11.1	10.5	21.6	10.5
	Sector	-5.4	25.4	20.0	10.5
	Status	1.2	12.4	13.6	-4.2
1996-1997	Education	2.2	15.5	17.7	24.2
	Age	-0.4	5.9	5.5	12.5
	Sector	0.4	1.0	1.4	18.4
	Status	1.4	6.1	7.5	7.8
1988-1997	Education	35.8	108.4	144.1	33.7
	Age	7.4	32.7	40.1	-19.9
	Sector	-6.6	43.2	36.6	-40.6
	Status	9.0	20.2	29.2	-35.6

Source: Own calculations based on the ENEU (3rd quarter).

The last period, from 1996 to 1997, deserves special comment. First because inequality was substantially reduced. Secondly because, once more, there were alterations associated with education, now working in the other direction, and such alteration appear to be the main factor responsible for the reduction in inequality. As it can be seen from the synthetic indicators, there was a small improvement in the distribution of schooling during the period and, a sizable decrease in the steepness of income profile related to education. All other variables, as observed for other periods, also contributed to an improvement in earnings inequality. Because the reasons for their reversal are not clear, a closer analysis of the returns to education will be carried out in section VI.

The next table shows the results of the same kind of decomposition for Brazil, Argentina and Peru. The significance of education as an explanation of changes in inequality seems to be a common pattern in Latin American countries. Moreover, the relevance of the income effect over the allocation (population) effect is also a trait shared by all countries where a similar analysis was carried out. Interestingly, in the Mexican case the figures are above those for other countries (in a shorter period of time length, one should stress). That means that the changes in the structure of supply and demand for labor, which are greatly affected by the educational and macroeconomic policies followed by the country and/or their interaction with the workings of the labor market, were particularly relevant for the earnings distribution.

Table 14. Education and Inequality Variation: Brazil, Argentina and Peru

Country	Author(s)	Period	Explanatory Power (%) ^{1/}	Income Effect (%)
Brazil	Ramos and Trindade (1992)	1977/1989	6-20	10-17
Argentina	Fiszbein (1991)	1974/1988	54-56	38-46
Peru	Rodríguez (1991)	1970/1984	32-47	34-43

^{1/}The explanatory power is the income plus the allocation/population effect.

VI. RETURNS TO EDUCATION

In light of the evidence that the income effect associated with education seems to be the most important factor for the explanation of changes in earnings inequality in Mexico, it is relevant to follow-up and to pursue the analysis of rates of return to education. Though this is a

common procedure, there is an important caveat, as the international comparison becomes cumbersome because the differences in the structure of the educational system in Mexico and other countries.

The earnings functions, for estimating the rates of return to education, can be fitted using “least squares” estimation. Also, a robust estimation technique has been developed recently, the quantile regression model, which is a special case of a location model.³⁰ The objective function in the quantile regression estimation is a weighted sum of absolute deviations (the weights are given by the chosen quantiles), which gives a robust measure of location, in such a way that the estimated coefficient is less sensitive to outliers. Moreover, when the error term is non-normal, quantile regression estimator may be more efficient than OLS estimators.³¹ Thus, both ordinary least squares and quantile regression models were estimated.³² However, before analyzing the rates of return to education, it is worth investigating the role of each explanatory variable in the determination of earnings. For such purpose, several regressions were fitted adding the explanatory variable one by one. This exercise has two advantages: (i) it clarifies the marginal contribution of each explanatory variable; and (ii) it highlights the role of each explanatory variable throughout the conditional earnings distribution. Cragg and Epelbaum (1996) performed a similar exercise.

As it was shown in the dynamic decomposition, education is the most important variable in the explanation of earnings inequality. However, one can also assess the importance of other explanatory variables using the estimates of educational level differentials. If the changes of such differentials in a given period of time have been smoothed by other explanatory variable, then such variable is a measure of some specific-skill. The relative change in the differentials by educational level in 1988-1992 and 1992-1997 periods were computed. The estimates are presented below.

Table 15. Change in Differentials Controlling for Economic Sector, Labor Market, Status and Region

Education level	Controlling for none		Economic Sector		Status		Economic Sector and Status		Economic Sector, Status and Region	
	1988-92	1992-97	1988-92	1992-97	1988-92	1992-97	1988-92	1992-97	1988-92	1992-97
Primary Complete	-0.03	0.05	-0.01	0.02	-0.04	0.03	-0.02	0.02	-0.02	0.01
Lower-Secondary Complete	-0.06	0.08	-0.05	0.03	-0.06	0.03	-0.03	0.00	-0.03	0.00
Upper-Secondary Complete	-0.02	0.11	0.02	0.04	-0.02	0.04	0.01	0.00	0.01	0.00
University Complete	0.14	0.18	0.15	0.08	0.12	0.09	0.15	0.04	0.15	0.04

Source: Own calculations based on ENEU (3rd quarter).

Note: Least squares estimates. The reference group is "Primary incomplete".

Table 15 shows that the changes in earnings differentials were “smoothed” by the introduction of the economic sector variable in the regression for 1992-1997 period, particularly for tertiary education,³³ while in the 1988-1992 period the “smooth” effect was very small. Labor

³⁰ For a brief review of this technique, see background paper 2.

³¹ This technique has been usually applied to analyze the determinants of wages structure as well as rates of returns to investment in education throughout the earnings distribution. Buchinsky (1994), (1995), and (1998) applies this technique to the U.S. labor market in order to assess the wage structure and its changes. Poterba (1994) also use the quantile regression to study the pattern of U.S. wage differentials between state and local government employees and their private counterparts. The quantile regression analysis has also been applied to other countries: Shultz and Mwabu (1996) to South Africa, Muller (1998) to Canada, Abadie (1997) to Spain, and, Montenegro (1998) to Chile.

³² The θ s parameters in the quantile regression were 0.1, 0.25, 0.5, 0.75, and 0.9, following a common procedure in the literature.

³³ For a reference see Cragg and Epelbaum (1996).

market status seems to have the same “smooth” effect pattern as the economic sector variable. These results suggest that the degree of correlation between education and economic sector, as well as labor market status, changed (this had been already detected in table 7, as the relation between gross and marginal contributions of economic sector as well as labor market status changed). In addition, table 15 shows that the “smooth” effect of the region variable was almost zero for both periods. In other words, the inclusion of this variable in the regression only produced a very small change in the earnings differentials (see the last four columns in table 15).

At this point, one tentative conclusion emerges: the smooth effect of both economic sector and labor market status variables were significantly larger in 1992-1997 period than in 1988-1992 period (before the trade agreement). This means that the relationship between those types of specific skills acquired through such variables and education changed in the labor market. This implies that worker’s insertion into the labor market and economic sector variables were a consequence of skill’s differentials and not solely attributed to education. Hence, in order to have a precise assessment of the marginal value to educational level the analysis must incorporate this based on the earnings regression conditional on economic sector, labor market status, region, as well as age, age squared and gender.

In the regression estimates, all the coefficients for education were significant at the 5% level, and the results for the marginal value of each educational level are reported in table 16.

In general the OLS estimates are quite similar to the ones obtained by the quantile regression approach for $\theta=0.5, 0.75$. It is also true, nevertheless, that the estimates through the latter technique tend to increase as one moves from the right to the left of the conditional earnings distribution, particularly for the upper levels of education. In summary, the results above have two strong implications: (i) education does play a crucial role in the process of earnings formation; and (ii) its effect is not the same throughout the conditional earnings distribution.

Specifically, one can say that the rewards to education display a log-convexity for all years investigated. This log-convexity, however, has become pronounced in the 1988-1996 period, as the marginal value for the higher levels increased relatively more. There was a reversal in this trend in 1997, basically due to the gains associated with primary complete and losses associated with the upper secondary, though in a slight way.³⁴

Table 16. Marginal Value of Education by Level

Quantile	1988						1992					
	0.10	0.25	0.50	0.75	0.90	OLS	0.10	0.25	0.50	0.75	0.90	OLS
Primary Complete	1.15	1.15	1.16	1.18	1.19	1.19	1.12	1.13	1.13	1.14	1.16	1.16
Lower-Secondary Comp	1.11	1.11	1.14	1.17	1.20	1.17	1.10	1.12	1.15	1.18	1.21	1.15
Upper-Secondary Comp	1.13	1.18	1.23	1.26	1.26	1.27	1.20	1.25	1.30	1.35	1.39	1.32
University Complete	1.34	1.39	1.44	1.46	1.52	1.49	1.46	1.54	1.66	1.70	1.69	1.69
Quantile	1996						1997					
	0.10	0.25	0.50	0.75	0.90	OLS	0.10	0.25	0.50	0.75	0.90	OLS
Primary Complete	1.14	1.14	1.15	1.17	1.20	1.15	1.15	1.16	1.17	1.18	1.18	1.18
Lower-Secondary Comp	1.12	1.13	1.15	1.18	1.20	1.16	1.11	1.12	1.14	1.18	1.22	1.14
Upper-Secondary Comp	1.21	1.25	1.31	1.40	1.48	1.34	1.20	1.25	1.31	1.39	1.47	1.32
University Complete	1.60	1.71	1.80	1.78	1.70	1.74	1.63	1.76	1.80	1.77	1.70	1.75

Source: Own calculations based on ENEU (3rd quarter).

Note 1: The marginal value is with respect to the previous education level

Note 2: The asymptotic covariance matrix of the estimated coefficient vector in quantile regression is computed using the bootstrap method Note 3: All the coefficient are statistically significant at 5%, and conditioned to age, squared age, gender, status in the labor market, economic sector and region (North, Center, South and Mexico City).

Regarding the accumulated changes in the marginal value of education by level (table 17), these are not significant for the primary complete and lower secondary instruction levels, along

³⁴ Needless to say, this pattern had already been detected through the synthetic indicator s.

the conditional earnings distribution for OLS estimates. In the case of upper secondary education the changes were substantial and very progressive across quantiles (8% at the median and 23% at the top decile) and even more so for the university level.

Table 17. Percentage Change in the Marginal Value of Education, 1988-1997

Quantile	0.1	0.25	0.5	0.75	0.9	OLS.
Primary Complete	0	1	1	0	-1	-1
Lower-Secondary Complete	1	1	0	1	2	-3
Upper-Secondary Complete	7	7	8	14	23	5
University Complete	34	45	43	36	20	30

Source: Own calculations based on ENEU.

In sum, the returns to education have increased in Mexico in recent times, especially for the higher levels of education and in the upper tail of the conditional earnings distribution. Given the previous remark and using the transition probability results (see background paper 2), it is plausible to assume that the relative demand shifts within economic sectors dominate the relative demand shifts between sectors.

Finally, with the goal of putting the rate of returns results in perspective, table 18 shows the return to education for other Latin American countries. Mexico's level of inequality is above the average, only after Brazil (the country that has the highest inequality in Latin America) suggesting that educational policies must be at the core of any effort aimed at reducing inequality, and by extension poverty, in Mexico.

Table 18. Percent Earnings Differentials by Country

	Latin America	Mexico	Brazil	Argentina	Peru
Primary Complete	50%	100%	100%	35%	40%
Upper Secondary Complete	120%	170%	170%	80%	80%
University Complete	200%	260%	280%	160%	145%

Reference group: non schooling

Source: IDB (1998).

The pattern observed in the rates of return for secondary level, including technical education, suggest that it is necessary to address more carefully the impact of this type of education on the earnings distribution.

TECHNICAL EDUCATION

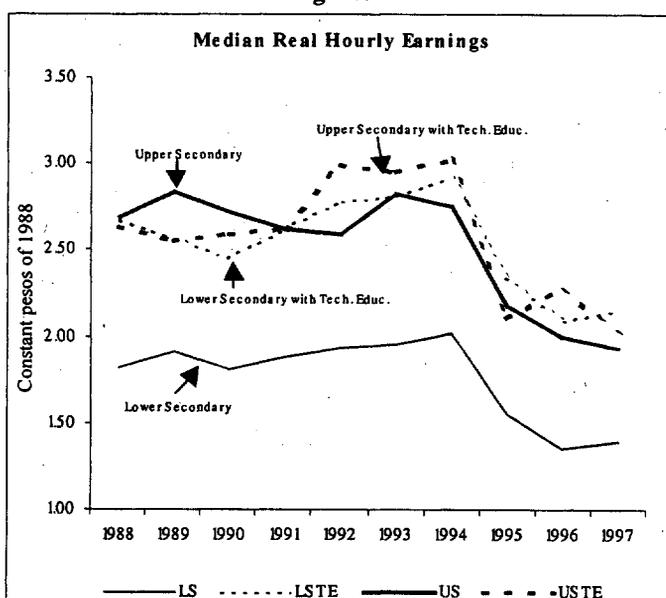
One alternative to improve worker's opportunities in the labor market is through the development of a more demand-driven, financially sustainable vocational training system with stronger links to industry and increased private sector participation, within the framework of a national system of labor competency norms and certification. Moreover, technical education and on the job training may be an alternative for those individuals that face both a high opportunity cost to continue formal education and need to acquire skills that enable them to participate in the job market.

This section provides answers to the following questions: Is there a significant change in earnings between secondary schooling and secondary schooling plus technical instruction? How much more does the labor market reward the skills or knowledge acquired through technical instruction or additional schooling? Is this premium growing or decreasing through time? Which income levels benefit more from technical instruction, training or additional schooling in terms of salary?

For the purpose of the analysis, we have selected the group of individuals in the labor force, non-seasonal workers are considered, between 16 and 65 years old with secondary instruction. This group is of interest because our results show that the greatest returns to schooling are at the top tail of the earnings distribution among those of lower and upper secondary levels. This group is divided into four categories, a) lower secondary complete (LS); b) lower secondary complete plus technical education or training (LSTE); c) upper-secondary complete (US); and, d) upper-secondary complete plus technical education or training (USTE).

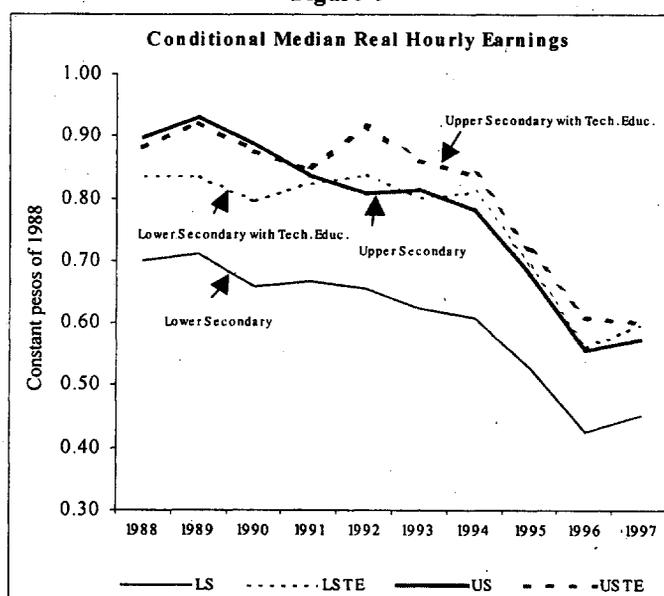
As indicated on figure 4, for all periods the conditional median hourly earning³⁵ for LSTE was much higher than for LS. USTE earnings are fractionally lower than US median hourly earnings, from 1988 to 1990. Yet, after 1990, conditional median hourly earnings for USTE were substantially higher than US. In addition, it seems there has not been a significant difference in conditional earnings between LSTE and US. The above results suggest that the skills or knowledge acquired through technical education after completing lower-secondary level is a key factor in the formation of earnings. Another noteworthy observation is that there is a significant difference between conditional median hourly earnings for workers with lower-secondary (LS) compared to those workers with either upper secondary plus technical education (USTE) or upper secondary (US), holding constant other characteristics such as experience.

Figure 3



Source: Own estimates based on ENEU (3rd quarter).

Figure 4



Source: Own estimates based on ENEU (3rd quarter).

As can be seen in the table below, the lower secondary share in the labor market has increased dramatically (from 0.19 to 0.30). The upper secondary has also increased but not at the same rate. On the other hand, both primary incomplete and primary complete have reduced their relative participation in the labor market.

Table 19. Total Share of Labor Market by Level of Education

Education	1984	1989	1992	1994	1996
Primary Incomplete	0.32	0.20	0.23	0.21	0.19
Primary Complete	0.32	0.29	0.27	0.27	0.25
L-Secondary Complete	0.19	0.26	0.28	0.28	0.30
U-Secondary Complete	0.10	0.15	0.13	0.15	0.16
University Complete	0.07	0.09	0.09	0.09	0.10

Source: Own estimates based on ENIGH.

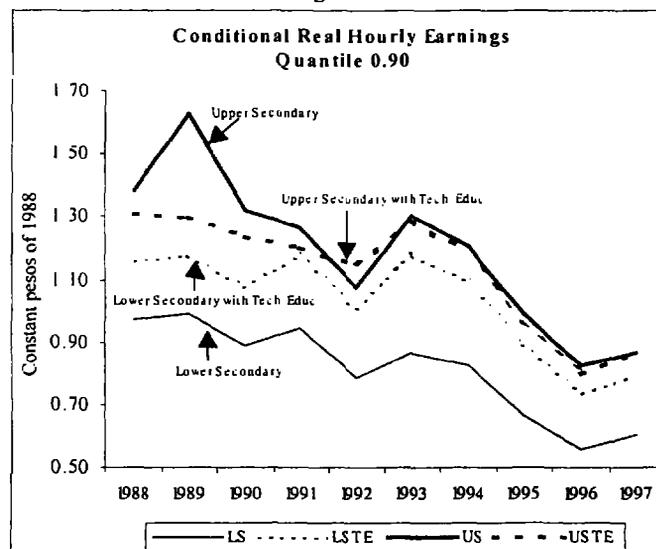
³⁵ Earnings regression conditioned on age, squared age, gender, economic sector and labor marked status.

The change of the structure in the labor market share for lower secondary and upper secondary educational level and the pattern of the earnings differentials among LS, LSTE, US, USET could possibly be the result of a combination of several factors: (i) during the 90's there was a high demand for skilled workers in Mexico. (ii) During the 80's there was a substantial increase in basic education coverage. And, (iii) the youngsters are facing several restrictions on continuing education after completing upper secondary instruction.

Quantile regressions at different mean values are shown next. These are attempted to assess which income groups lead the earnings gap found in the previous figures. The results from the conditional hourly earnings evaluated at the first decile show that there is not a significant difference in conditional hourly earnings for those individuals with US, USTE or LSTE levels of education. While there is a major disadvantageous gap for those individuals with LS instruction versus the other three levels of schooling. The conditional hourly earnings, evaluated at the 25 percentile, resemble the leveling off and gap difference observed for the first decile.

The figure below shows that all series fluctuate considerable. However, after 1992, the way in which US and USTE condition hourly earnings resemble each other first reaches a peak and then decreases steadily. The same applies to LS with substantially lower earnings fluctuating and then decreasing steadily up to 1996 when they all increase marginally. Meaning that, the increased earnings premium on technical education at the top tail of the income distribution raises the rate of return from investing in that level of education. The significant increases in private rates of return in higher education observed in recent years makes compelling the case for leaving decisions of how much to invest to the private sector.

Figure 5



Source: Own estimates based on ENEU (3rd quarter).

VII. CONCLUDING REMARKS

- Even though the education attainment levels expanded very rapidly, Mexico also experienced a pronounced increase in the degree of income and earnings inequality over the period of analysis. Most of the worsening of income distribution happened in the mid-eighties. The early nineties, display little variation in earnings inequality except for a small trend towards deterioration.
- It was shown that education is by far the variable that accounts for the largest share of earnings inequality in Mexico, both in terms of its gross and marginal contributions. The results of the gross contribution and the marginal contribution of education to inequality indicate that as the Mexican economy progresses, education becomes even more important in determining the choices of sectors and occupations. This is, the marginal contribution of education by itself remains the same, but the gross contribution increases.
- The gross contribution of age to inequality has been going up and at the same time its marginal contribution has been decreasing. In other words, differences in both educational attainment and distribution among cohorts have become pronounced in recent times, leading to a higher correlation (negative) between education and age. The education contribution to income distribution in Mexico is the second highest in Latin America, next to Brazil. Moreover, what seems to be particularly interesting in the Mexican experience is the fact that the significance of education has been increasing over time.
- The increase in earnings inequality does not appear to be the result of a worsening in the distribution of education, whereas the income profile, which is related to the returns to schooling, has become much steeper. Meaning that, there was a shift in demand towards high skilled labor that was not met by the increase in supply probably due to the increased rate of skill-biased technological change, whose transmission to Mexico may be facilitated by the economy's increased openness.
- Women are undoubtedly more educated than men. More educated women at a time of greater female labor force participation points in one direction -a relaxation of the supply constraint which has kept earnings differentials high. The policy implication is to make it easier for women to work in the labor force through greater investment in early childhood care or other options, which would permit women to transform their education into productive gains for the society.
- It was shown that the returns to education have increased in Mexico in recent times, especially for the higher levels of education groups and in the upper tail of the conditional earnings distribution.
- One alternative to improve worker's opportunities in the labor market is primarily through the development of a more demand-driven, financially sustainable vocational training system with stronger links to industry and increased private sector participation, within the framework of a national system of labor competency norms and certification. In parallel, technical education may be an alternative for those individuals that face both a high opportunity cost to continue formal education and need to acquire skills that enable them to participate in the job market. The skills or knowledge acquired through technical education, after completing lower-secondary level, is a key factor in the formation of earnings.

Chapter 2. Education and Public Policy³⁶

Chapter 1 concluded that education does play a crucial role in the process of earnings formation and that the returns to education have increased in Mexico in recent times, especially for higher levels of education and in the upper tail of the conditional earnings distribution. Namely, educational policies must be at the core of any effort aimed at reducing inequality, and by extension poverty, in Mexico. In light of such findings, this chapter examines the government's educational policy response in the face of possible further increases in earnings inequality (technological changes in the same direction). In particular, it is analyzed both public and private educational expenditure patterns: How are federal and total subsidies distributed across income groups and by level of schooling? How have federal subsidies evolved through time? Which are the determinants of school enrollment by income groups and location? How do individuals' educational expenditures affect school enrollment patterns? What would an average household with a given set of characteristics be willing to spend on an individual child, if subsidized public education facilities were not available? What would the household have "saved" by sending the child to public schools instead of private schools? How large are these "savings" for various income groups?

The chapter is structured as follows: Section 1 has a brief review of the education system in Mexico. Section 2 discusses the two elements of the benefit-incidence analysis: enrollment and education expenditures in Mexico, also examines the distribution of total subsidies allowance for each state, across the levels of education and income deciles. Section 3 examines private expenditures on education and the determinants of upper secondary enrollment. Section 4 analyses the marginal willingness to pay for educational services. Last section presents the concluding remarks.

I. PUBLIC EDUCATIONAL SYSTEM

The structure of Mexico's educational system has the following main characteristics. First, there is basic education, which is the government's priority. The basic education system consists of (i) early childhood education (or pre-school), which is optional for children 3 to 5 years old and (ii) mandatory primary education where the official entry age is 6 and ideally should be completed in 6 years. In fact, due to late enrollment and grade repetition, however, the target population is 6 to 14 years; (iii) mandatory lower secondary school consist of a 3-year cycle, and it is intended for children ages 12 to 16. At this level, the structure is divided in two areas: general and vocational/technical. In parallel, the system also includes the *telesecundaria*, a distance education program designed to reach remote areas through the transmission of recorded lessons via television network supported by face to face assistance from tutors.

The next level, following basic education, there is middle level education with options available to students who may choose technical schools and upper secondary education. The duration of these programs is 3 years. A high percentage of the students go for *bachillerato* also called upper-secondary which allows them to pursue tertiary instruction. On the other hand, a demand for technical studies has been increasing steadily in recent times. Finally, there is tertiary education. This level of education encompasses three lines of study: a system of federal technological institutes, state and autonomous universities, and teacher-training institutes. There is at least one university for each state, and the large universities have campuses in various cities.

³⁶Based on background papers 3 and 4.

II. ENROLLMENT AND PUBLIC EXPENDITURES IN THE BENEFIT INCIDENCE ANALYSIS

Two general approaches for measuring public education expenditure benefit can be identified. Although neither is able to adequately resolve the various difficulties related to variables such as individual or household characteristics and quantity constraints. The first approach is based on benefit-incidence and assumes that the value of the benefits of education equals the unit cost of providing the service. The second approach, the marginal willingness to pay, attempts to measure the benefits by using a related notion of consumer surplus (examined in section IV). This paper discusses both and applies the corresponding methodologies to the ENIGH household income and expenditure surveys.

The benefit-incidence methodology applied in this section, ranks individuals into groups by income deciles. It then draws information on individual public school enrollment by state and decile to tally up numbers of beneficiaries of each group. These numbers are then multiplied by the government's unit cost of provision allowance for each state and educational level. This provides a profile of distribution for a specific category of educational public expenditures throughout the distribution of income or the "benefit incidence". Thus this technique assumes that the benefit derived from education is equal to the government cost of providing this service.

The incidence analysis brings together two sources of information. First, data from income-expenditure surveys (ENIGH) used to construct the deciles and the enrollment. The ENIGH surveys identify the educational level, type of school and total income/expenditure. Second, government expenditures (Federal plus State) on education assigned to the different levels of schooling for each state from the Direccion General de Planeacion, Programacion y Presupuesto, DGPPyP, (Ministry of Education) used for calculating unit costs.

Equity issues are then analyzed using the Lorenz Curves based on the pattern of government subsidies to education received by different population groups, highlighting the results of changes in the use of educational services and change in government's expenditures for education by levels and by region.³⁷

II.1 ENROLLMENT RATES

As shown on table 20 variability of enrollment between poor and non-poor individuals is not substantial at the primary level. However, urban areas show slightly larger primary enrollment rates than in rural areas, which might be explained by higher accessibility and affordability to the private system. Enrollment rates for the educational levels beyond primary and probable lower-secondary levels decrease dramatically, particularly for the extremely poor, thus resulting in an increase in the educational gap between poor and non-poor. Background paper 3 shows enrollment by educational level and types of schools used in the benefit incidence analysis.

³⁷ For a review see Dominique Van de Walle and Kimberly Nead (1995).

**Table 20. Total and Public Enrollment Rate by Poverty Status, Location and Level of Education
1996, INEGI/CEPAL Poverty Line**

Poverty Status	Urban		Rural		Total	
	All	Public	All	Public	All	Public
Primary (6-11 years old)						
Extreme	93.2	93.2	93.5	93.5	93.3	93.3
Moderate	96.4	96.4	94.6	94.6	96.0	96.0
Non-poor	96.1	95.7	96.4	96.3	96.1	95.7
Total	95.4	95.2	93.9	93.9	94.9	94.7
Lower Secondary (12-14 years old)						
Extreme	49.1	48.9	29.0	28.8	37.9	37.6
Moderate	68.7	68.8	51.0	51.2	64.8	64.9
Non-poor	81.4	81.3	59.5	59.8	79.1	78.8
Total	68.5	67.7	36.8	36.6	58.4	57.4
Upper Secondary (15-17 years old)						
Extreme	23.5	21.4	6.9	5.9	14.5	12.9
Moderate	39.6	36.8	22.2	21.7	36.0	33.5
Non-poor	61.7	54.0	24.5	21.8	58.0	50.1
Total	45.7	39.8	12.8	11.7	36.4	31.2
University (18-24 years old)						
Extreme	3.4	2.9	0.4	0.4	1.8	1.6
Moderate	7.4	7.0	2.3	2.2	6.4	5.9
Non-poor	24.0	17.6	5.9	5.4	22.0	16.1
Total	15.3	11.5	2.0	1.8	12.0	8.9

Source: Own calculations based on ENIGH96.

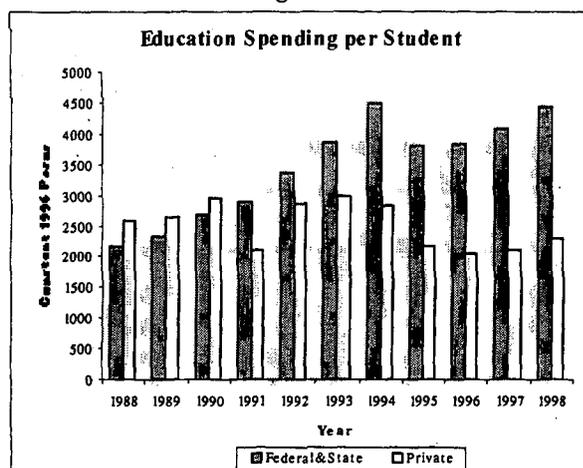
Given that coverage at primary level and the first years of lower secondary is already sizable and decreasing due to demographic factors which cause the population in this group to stagnate and start to shrink at the beginning of the next century.³⁸ This in turn frees some resources so that coverage may be increased at the upper-secondary level.

II. 2 PUBLIC EDUCATIONAL EXPENDITURES

Total public education spending per student in Mexico increased steadily up to 1994 and peaked in 1998, even though the total student population increased from 26 million in 1994 to 28 and a half million in 1998. By 1998, total spending in education increased by 5.2 percent of GDP, less than a full percentage point above the 4.9% of GDP reached in 1995. The federal government currently accounts for close to 80% of total sector spending.

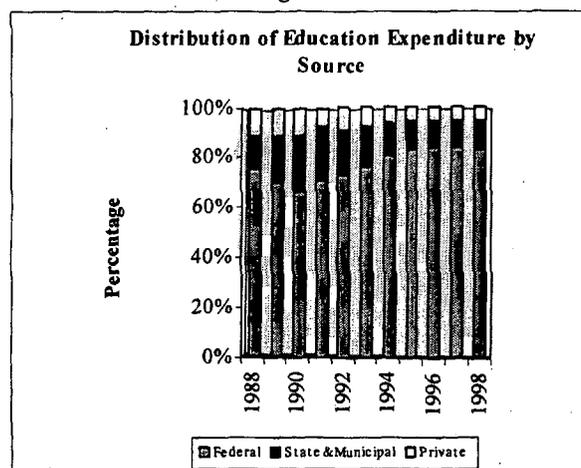
³⁸ From 1973-1994, there was a change in the population structure: the population ages between one year through 14 dropped 36%, those between 15 and 64 increased 59.8% and the age group over 65 rose 4.2%.

Figure 6



Source: IV Informe de Gobierno, 1998

Figure 7



Source: IV Informe de Gobierno, 1998

A desegregation of public expenditures in education by instruction level for 1994 and 1996 is shown below. Public expenditures in primary and lower secondary absorb a large proportion (59% in 1996) of federal budgetary resources for formal education services. Yet, public expenditures in upper secondary and tertiary level were 13.7% and 27.3% each respectively. Another observation about the evolution of educational public spending is that it seems it has become more egalitarian in per-capita terms across different schooling categories.³⁹ In the early 1980s, the amount of federal spending per university student was 10 times the amount spent per primary student. This ratio fell to around 7 times in the early 1990s. Federal spending on the other levels relative to the primary level indicates a similar decline, even though the absolute amounts increased at all levels. In 1996, upper-secondary received 1.5 as much as each primary school student and each university student received five times as much as a primary student.

Table 21. Federal and State Expenditures on Public Education, 1994 (Thousands of current pesos)

	Primary	Lower Secondary	Upper Secondary	Tertiary
Federal Expenditure	17,947,229	8,603,383	6,610,913	13,141,420
State Expenditure	N/A	N/A	N/A	N/A
Total Expenditure	17,947,229	8,603,383	6,610,913	13,141,420
Enrollmen(enigh)t	13,593,797	4,661,522	2,386,758	1,461,189
Subsidy per Student (pesos)	1,320	1,846	2,770	8,994
Primary Student equivalence (only Federal subsidy).	1.00	1.40	2.10	6.81

Sources: ENIGH 94 and DGPPyP (1999), SEP

Table 22. Federal and State Expenditures on Public Education, 1996 (Thousands of current pesos)

	Primary	Lower Secondary	Upper Secondary	Tertiary
Federal Expenditure	33,328,323	13,394,898	10,884,850	21,651,986
State Expenditure	8,920,249	4,747,407	1,869,710	2,210,962
Total Expenditure	42,248,572	18,142,304	12,754,560	23,862,948
Enrollment(enigh)	13,802,395	4,972,116	2,767,993	1,459,820
Subsidy per Student (pesos)	3,061	3,649	4,608	16,347
Primary Student equivalence (Federal plus State subsidy)	1.00	1.19	1.51	5.34

Source: ENIGH 96 and DGPPyP (1999), SEP

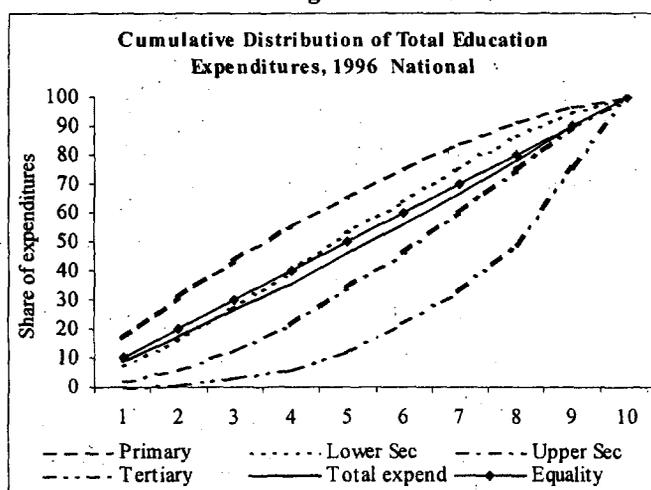
³⁹ IV Informe de Gobierno, 1998.

1.3 BENEFIT INCIDENCE ANALYSIS

Next, a comparison was made between the cumulative distribution of the various educational sub-sectors and the distribution of per capita annual total and federal public educational expenditures. Before said, in order to derive the cumulative distribution for various educational levels, individual public school enrollment by state and decile is multiplied by the government's unit cost of provision allowance for each state. This is also done subsequently by region and state.

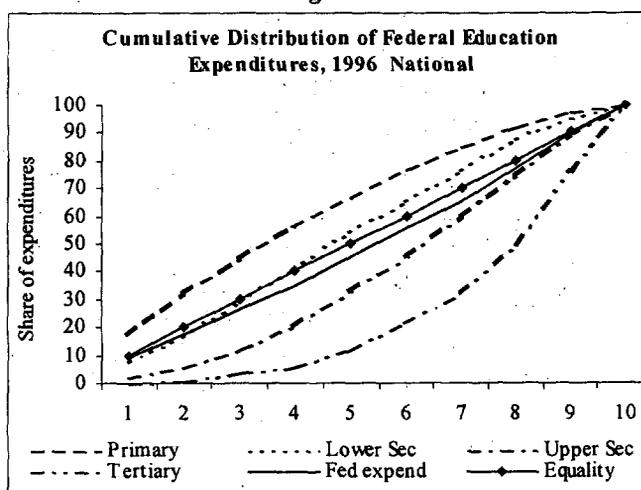
Figures 8 and 9 show the cumulative distribution by *total and federal educational expenditures* for all of Mexico. One of the main messages is that the poorest income/expenditures deciles receive the bulk of the primary education subsidy. This same group, at higher levels of education receives progressively smaller subsidies. This indicates that primary education is very progressive and lower-secondary education is basically neutral. Upper-secondary schooling, benefits the middle and upper classes. Finally, the tertiary level is strongly regressive in that it mainly benefits the richest deciles. At national level, public expenditures seem quite equal, as shown by the fact that the expenditure line lies very close to the 45 degree diagonal.

Figure 8



Source: ENIGH 96 and DGPPyP, SEP

Figure 9



Source: ENIGH 96 and DGPPyP, SEP

When desegregated by region, it becomes evident that the educational inequality in the Central Region of Mexico leads the national pattern. Still, in the Central Region, the curve for total and federal schooling expenditures lies above the equality line. This implies that on average total schooling expenditures for that region are more uniformly distributed than the national pattern.

The distribution of the average subsidy in the South Region and Tabasco State lies above the average distribution for the North Region. One plausible explanation is the higher concentration of the enrollment in the lower deciles (mainly in primary) in the South Region and Tabasco compared to the concentration in the North, where the students are in the medium and top deciles. In the South, public enrollment is highly progressive particularly for primary school, as shown by the fact that public school enrollment is above and far from the 45 degree diagonal. It should also be mentioned that public education spending in upper-secondary in Tabasco is basically neutral at high level of income, while progressive at the bottom of the distribution.

In the North Region, the cumulative distribution of education subsidy lies below the 45-degree diagonal, except for primary schooling, which is near the equality line. In general, both larger populations in the medium and top deciles, and higher enrollment rates in the higher levels can explain this, which probably reflects higher incomes in the North Region and easier access to schools.

The distribution of per capita public expenditures in Mexico City is far below the 45-degree diagonal indicating that it is very regressive. Public expenditures in primary level are progressive for the highest income deciles, in that the primary curve lies above the 45-degree axis and it is much more progressive than the distribution of per capita expenditures, reflecting the fact that fewer higher income children attend public primary schools. Spending at the lower and upper secondary level is more progressive than the public expenditures, although the curves still lie below the 45-degree diagonal. Only university instruction is more regressive than the average distribution of total expenditures. Interestingly, public expenditures in education in Nuevo Leon are far below the 45-degree diagonal following a pattern similar to Mexico City.

The evidence presented suggests that public subsidies for education, particularly at the tertiary level, are regressive. A large share of public resources is given to the high-income level students. A strategy to reallocate public expenditures from tertiary to secondary level in order to favor the poor would involve a comprehensive agenda that would meet the challenges posed in upper-secondary level such as financing and the quality of education, as discussed in chapter 3.⁴⁰

III. PRIVATE EXPENDITURES IN EDUCATION AND THE DETERMINANTS OF ENROLLMENT

On the demand side, household enrollment patterns are highly dependent on the cost of schooling. This section shows that, in addition to the cost of schooling, there are other factors that affect the probability of enrollment. The total monetary cost for the household, without considering the opportunity cost, comprises school fees, tuition and unforeseen expenses, transportation cost, textbooks, stationery, and uniforms. Private costs of education could be considered modest in terms of average earnings, but they are significant when compared to the earnings of workers without experience, which has an impact on student's decision to continue his studies to a certain level or begin working without completing his degree.

Table 23 below illustrates the fact that most students in private schools spend more than twice the amount that public school students spend in education. As it can be observed in this table, the share of the expenditures in services and materials are similar for both private and public school, while the fees and unforeseen expenses constitute the differences in total school expenditures between private and public schools. In private schools, fees and unforeseen expenses account for 70% of the school expenditures compared to 38% in public schools. Moreover, the educational expenditures in the urban areas are twice as high as in rural areas.

Table 23. Household Expenditure in Education by Poverty Status, 1996

Poverty Status	Expenditures per student (%)				Educational Expenditures (%) ^{2/}	Services, materials Expenditures (%) ^{2/}	Number of Households
	Fees/Unforeseen expenses	Services	Materials ^{1/}	Total			
Private schools							
Extreme	70.3	1.0	28.7	100.0	14.6	4.3	12
Moderate	75.1	4.3	20.7	100.0	11.1	2.8	50
Non poor	70.8	5.5	23.7	100.0	16.7	4.9	499
Total	70.9	5.4	23.7	100.0	16.6	4.8	561
Public schools							
Extreme	32.2	1.2	66.6	100.0	6.3	4.3	2825
Moderate	35.2	2.4	62.4	100.0	7.0	4.5	2511
Non poor	41.8	5.4	52.7	100.0	6.7	3.9	2544
Total	38.3	3.8	57.8	100.0	6.7	4.2	7880

Source: Own calculations based on ENIGH.

^{1/} Textbooks, stationery, etc.

^{2/} As percentage of household's expenditures.

⁴⁰ The comparison of the distribution of the federal subsidy across years is reviewed in background paper 3.

Table 24 compares the expenditure of poor and non-poor students by education level, showing significant disparities. At primary level, non-poor students in public school spend four times the amount than extremely poor students spend in education. While at the university level non-poor individuals spend 1.4 times as much as poor students. These differences might be partly explained by scholarships or discounts on tuition fees among the poor. (Absolutes amounts are in background paper 4).

Information at the individual level on schooling expenditures is available only for school fees, tuition and unforeseen expenses, but assuming that the amount spend on materials and services is fixed for all levels of education, the individual total educational expenditures are much lower than the government subsidy. In fact, the public subsidy compared to the average student expenditure is 2.8 times for primary level, 2.3 for lower secondary, 2.2 for upper secondary and 5.2 for university.

Table 24. Expenditures in Education per Student (Fees/tuition/unforeseen expenses)^{1/} by Level of Education, 1996

Poverty Status	Primary	Lower Secondary	Upper Secondary	Tertiary
Public and Private schools				
Extreme	76.7	268.2	851.9	1828.7
Moderate	186.3	491.6	975.9	835.9
Non poor	1378.9	1404.7	2965.1	5448.7
Total	425.4	750.1	1996.2	4466.8
Public schools				
Extreme	74.6	262.4	760.1	1828.7
Moderate	179.4	485.2	883.7	817.4
Non poor	307.4	712.5	1292.1	2577.7
Total	156.8	492.9	1057.4	2141.6
Private schools				
Extreme	1422.5	1252.5	2845.0	0.0
Moderate	1739.0	1088.7	2540.3	1179.4
Non poor	6468.1	6539.0	8515.2	12950.5
Total	6241.9	5915.4	7495.3	12451.3

Source: ENIGH96

^{1/} Annual pesos per student

The total cost (student expenditure plus government subsidy) per student in primary public school corresponds to about 35% of the private primary school cost. For students in lower and upper secondary it represents 43% and 53%, respectively. On the other hand, the cost of tertiary level is 13% higher in public schools as compared to private (see tables below). An interesting question that arises is why the cost at tertiary level is higher in public than in private schools. Is it because the subsidy is not being used efficiently, or because the infrastructure (research institutes, libraries, museums, entertainment centers, etc.) they offer is costly?. In the next section a technique is applied that will allow us to evaluate the impact of public expenditures on household spending patterns.

Table 25. Individual Educational Expenditures^{1/} plus Subsidy in Public Schools by Poverty Status^{2/}

Poverty Status	Primary	Lower Secondary	Upper Secondary	Tertiary
Extreme	2799	3266	5002	16970
Moderate	3267	3852	5489	16322
Non poor	3941	4626	6444	18629
Total	3268	3883	5686	17670

Source: ENIGH 96 and DGPPyP, SEP

^{1/} Fees/tuition/unforeseen expenses, services and materials, ^{2/} Annual pesos

Table 26. Individual Educational Expenditures^{1/} in Private Schools by Poverty Status^{2/}

Poverty Status	Primary	Lower Secondary	Upper Secondary	Tertiary
Extreme	2295	2125	3717	
Moderate	2390	1740	3191	1831
Non poor	9851	9922	11898	16334
Total	9387	9060	10640	15596

Source: ENIGH 96 and DGPPyP, SEP

^{1/} Fees/tuition/unforeseen expenses, services and materials, ^{2/} Annual pesos

The preliminary results on the pattern of individual expenditures with children in public schools suggest that the burden on poor households can be substantial, and that it is unlikely that a poor household would afford to attend private school.⁴¹

Determinants of Enrollment and Transition

Other factors that affect the enrollment decision after lower secondary, as estimated from the probits for enrollment, show that the probability of enrollment is positively influenced by the household's head educational level, dwelling services such as sewage and per capita household income⁴². Aside from being sewage an important indicator of family wealth, the absence of sewage suggest the possible necessity for children to be involved in a greater number of household chores. The positive marginal effects from such variable increases by 7% the probability of enrollment.

Variables with a negative influence include student's age and family size. On the other hand, gender is not significant. Note the 12 % negative impact of some primary schooling for the household head in the poorer group, as compared to the statistically insignificant impact of this variable on enrollment probability amongst the richer group. Similarly, household head income per capita has a 5% positive impact on the probability of enrollment in urban areas, and the impact of household head income per capita is absent among the rural.

Table 27. Determinants of Upper Secondary School Enrollment, 1996

	Full Sample	Poorest 40%	Richest 40%	Urban	Rural
Probability of enrollment	0.66	0.49	0.82	0.73	0.39
Mean Income	7.44	6.63	8.14	7.56	7.03
Mean teachers	1.89	1.80	1.95	1.90	1.84
Income Elasticity	0.58	-1.11	0.44	0.53	0.11
Teachers Elasticity	0.20	0.49	0.04	0.08	1.19

Source: Own calculations based on ENIGH.

As can be seen on table 27, the probability of enrollment in upper-secondary is much higher for both the top 40% of the income distribution and in urban areas when compared to those in the bottom 40% and in rural areas. The variable teachers (government effort) has a significant marginal impact which is many times larger for the 'Poor' as compared to for the 'Wealthy' and for rural areas as compared to urban areas. In elasticity terms, the teacher's variable is more effective for the poor and for the rural areas by factors of 12 and 15, respectively. The differential impact suggests that the goal of efficiency in terms of maximizing enrollments in upper-secondary school does not have a trade-off with the goals of greater equity of educational opportunity. Indeed, the above findings indicate that increases in enrollment will be more readily obtained if resources are successfully targeted towards the poorer income group. It is of interest to note the negligible impact of educational transfers, which could probably be explained by the null variance of transfers among states.

⁴¹ An illustration of the disproportional burden of education on the poor individuals can be obtained by comparing household expenditures on education with non-food expenditures per capita.

⁴² The probability being modeled is enrollment in upper secondary school for individuals age 15 to 19 and conditional to lower secondary completed. For more details see background paper 4, section 4.

IV. ESTIMATING THE EFFECT OF GOVERNMENT SPENDING ON HOUSEHOLD EDUCATIONAL EXPENDITURES

In section II it was assumed that the subsidy and the quality of education are uniformly the same for all income deciles. This is a strong assumption that tends to minimize the distributional inequity within educational levels. The marginal willingness to pay methodology prevents this drawback. The methodology estimates a willingness to pay equation for private school services corrected for self-selection bias, using standard Heckman methodology.

In analyzing the impact of public spending on household behavior, this section focuses in the following questions: What would an average household h with a given set of characteristics (Xh) be willing to spend on an individual child i with traits (Xc), if subsidized public education facilities were not available? What would the household have “saved” by sending the child to public schools instead of private schools? How large are these “savings” for various income groups?

Intuitively, one would think that household “savings” could be estimated as the difference in household education spending on public versus private schooling of children of comparable characteristics. While the concept appears straightforward, the estimation is not. The challenge is to ensure that these two groups of children are comparable. One can argue that due to observable and unobservable factors, the two groups of children are in fact different. Examples of measurable variables are family income and parents’ education. Examples of unobserved variables that can generate self-selection bias is preference for religious instruction, high rate of return to quality due to child’s exceptional intelligence, and taste for individualized instruction. Lack of control for these unobservable factors would overstate the potential household “savings” associated with the provision of subsidized public education. Households send their children to private schools despite availability of public school places, because they want higher quality and additional services that they cannot find in public schools.

The *marginal willingness to pay methodology* starts by estimating a probit equation. The probit equation or step 1 has as dependent variable whether child i is attending private school (value of 1) or public school (value of 0). The explanatory variables are per capita household income, years of school of household head (hh), area (urban/rural), age, gender, number of rooms, type of floor and number of children in household. The trigger variable, that identifies the model, is the amount of students per classroom, by type of education (public versus private) and level of instruction at municipal level. Table 28 provides the results of the estimation.

Table 28. Probit on Private School Attendance

Explanatory Variable	Coefficient	Marginal Effect
Per capita income	0.78 *	0.064
Years of schooling of head	0.03 *	0.002
Area (<i>rural</i>)	0.80 *	0.046 +
Age	0.16 *	0.014
Age squared	0.00 *	0.000
Gender (<i>female</i>)	-0.12 **	-0.010 +
Number of rooms	0.09 *	0.008
Floor (<i>not finished floor</i>)	0.40 *	0.037 +
Sewage (<i>not sewage</i>)	0.32 *	0.024 +
Number of Children	-0.10 *	-0.008
Trigger Variable	-0.09 *	-0.008
Constant	-7.56 *	

Source: Own calculations based on ENIGH 96 and DGPYP, SEP

* Significant at 5% ** Significant at 10%

Italics: indicate the reference category for dichotomous variables

(+) dF/dx stands for the discrete change in the dummy variable from 0 to 1

The first column on table 28 has the coefficient and the second shows the marginal effects as estimated from the probit.⁴³ Notice that all explanatory variables are significant at 5% level, except for the gender. In addition, all explanatory variables show the expected sign on the probability to attend private school. For instance, the probability to attend private school is positively influenced by per capita household income and area.

The household's willingness to pay for private education (P_v) of child i (step 2) in this methodology is estimated using total educational expenditures on private schools (fees, tuition, unforeseen expenses and school materials⁴⁴) as dependent variable.⁴⁵ Explanatory variables are Mills' ratio and the variables from the probit estimation except the trigger variable.

Using the estimates from step 2 and step 3 and the mean of all explanatory variables, one can compute the amount of money that households would be willing to pay for the child's private education ($MMWP_v$, step 4) or public education ($MMWP_u$, step 5). Notice that the difference between $MMWP_v$ and $MMWP_u$ measure the effect of the government provision of public schools on the education spending behavior of an average household. In other words, this difference reflects the relative quality and payments (fees and unforeseen expenses) associated with public and private schools.

Next, how large the household "savings" is computed for different population subgroups by area, poverty status, level of schooling and total educational expenditures quantiles. Background paper 4 shows the average values of the explanatory variables for the different population subgroups. Before said, these values are used to compute the marginal willingness to pay corrected for self-selection bias.⁴⁶

All the explanatory variables turn out significant in the process of computing the marginal willingness to pay for public educational service except for gender. In the case of private education, the relevant variables are income, years of schooling of head of the household and sewage.

Table 29. Effect of Public Schools Provision on an Average Household Education Spending^{1/}

MMWP _v	6274.88
MMWP _u	1080.92
Effect or "savings"	5193.96

Source: Own calculation based on ENIGH 96

^{1/} Annual 1996 pesos

Assuming that there are no differences in the quality of education between a public and a private school is seen in table 29 (after controlling for observed and unobserved factors) that family's savings from sending a child to a public school amounts to approximately \$5,000 pesos per year (0.56 minimum wages in 1996). In addition, the results suggest that such savings are correlated with the schooling of the household head, location and number of children at home.

Now, assuming that the difference between private and public schools students' scores is only 10%, then, ninety percent of the effect or "savings" is due to relative payments and unforeseen expenses. The rest will reflect the amount that the average child would have to pay for "quality difference" in moving from a public to a private school.

⁴³ The marginal effect for continuous variables is the marginal effect as evaluated at the mean of the particular exogenous variable. Dichotomous variables have been coded as '0' or '1', and the marginal effect for such variables represents the impact of the probability of having a '1' value for the exogenous variable, as compared to a '0' value, the other variables being held constant at their mean values.

⁴⁴ Included only those students with positive fees, tuition and unforeseen expenses.

⁴⁵ Step 3 uses public educational expenditures instead of private ones.

⁴⁶ Note that it is not possible to compare directly actual average payments with the marginal willingness to pay since the later controls for observed factors.

The marginal willingness to pay desegregated by area is shown on table 30. Assume that the quality between public and private schools in both rural and urban areas is the same, then, it turns out that the government provision of public schools is higher in urban areas than in rural areas. This result could be explained among other things, by the following factors: (i) poor location of public educational services; (ii) distance that an individual has to travel to the nearest school; (iii) the population dispersion and lastly the opportunity cost of the children in rural areas.

On the other hand, assuming that there is not a quality difference between private-public schools in rural areas and the quality difference between public-private schools in urban areas is a little above 50%, the relative payments and unforeseen expenses would be the same in both areas. Finally, assuming that the quality difference between public and private rural schools is zero, but the quality difference in urban areas is 10%, then the relative payments and unforeseen expenses (as part of the "effect") in urban areas is higher than in rural areas (urban effect \$4,016 pesos and rural effect \$2,245 pesos). In summary, such scenarios suggest that students in urban areas get a larger share of the subsidy or "savings" from the government provision of educational services compared to these in rural areas.

Table 30. Effect ^{1/} of Public Schools Provision on Household Education Spending by Area

	Urban	Rural
MMWP _v	6459	2674
MMWP _u	1438	429
Effect	5021	2245

Source: Own calculation based on ENIGH 96

^{1/} Annual 1996 pesos

As shown on table 31, the government provision to public schools has a smaller impact on the poor as compared to the non-poor. For both poor and non-poor, gender is not important in the determination of the *MMWP_u*, while per capita household income, age, and number of children do have an impact. It is important to note that while the education of the household head determines the *MMWP_u* for the poor, it does not affect it for the non-poor. With respect to *MMWP_v* by poverty status, the educational level of the household head affects the *MMWP_v* for both groups, while the per capita household income does affect the non-poor. The age of the children impacts on the *MMWP_v* of the poor, but it does not have any effect on the non-poor. Finally, again gender is not important in the *MMWP_v* for the poor as well as for the non-poor.

The analysis by poor/non-poor and region suggest the following: (i) non-poor, and those who live in urban areas, get a large share of the subsidy or "savings" from the government provision of education services. And (ii) the valuation for private educational services is higher for the wealthy as compared to the poor. In light of these results, plausible alternatives for the government include: (i) to better target public educational services; (ii) charge a fee for public educational services to the non-poor; and (iii) increase the quality of education for the poor.

Table 31. Effect ^{1/} of Public Schools Provision on Household Education Spending by Poverty Status⁴⁷

	Extreme	Moderate	Non Poor
MMWP _v	2114.63	2963.22	7229.76
MMWP _u	849.23	1241.22	1073.99
Effect	1265.40	1722.00	6155.77

Source: Own calculation based on ENIGH 96

^{1/} Annual 1996 pesos

At the primary level, all explanatory variables turned are significant for explaining the *MMWP_u*. In lower secondary level, the variables household per capita income, region, number of

⁴⁷ Assuming that the income distribution for the extreme poor is uniform, it turns out that an average poor household earns \$9510.00 annual 1996 pesos. Note that it is assumed that the family size is 5 members and that the extreme poverty line is \$317.00 monthly per capita 1996 pesos.

rooms, type of floor and number of children are important in the determination of the *MMWPU*. While for upper secondary instruction, household per capita income and age are relevant. Interestingly, household per capita income is also a significant variable in explaining *MMWPv*. This suggests that parent's valuation for private educational services relies solely on income while for public educational services there are other important factors in addition to income that determines the parent's valuation for public educational services.

In table 32, the effect of government provision of school services is very similar for both primary and lower secondary school levels (basic education).⁴⁸ This effect is higher in basic education as compared to upper secondary or technical education. Assuming that the quality difference between private and public schools is only 10% for all levels of education, relative payments and unforeseen expenses ("savings") will be much higher in basic school as compared to upper secondary level. As derived in section 3, for primary through upper-secondary level, there is a positive decreasing relationship between the payments difference (in private versus public schools) and instruction level. Allowing such difference to be a proxy for quality, then, the quality difference between private and public schools in primary level is 70%, in lower secondary is 60% and in upper secondary is 50%. This indicates that quality differences are higher in primary level. The remaining savings are due to payments and provisions.

Table 32. Effect¹¹ of Public Schools Provision on Household Education Spending by Educational Level

	Pre Primary	Primary	Lower Secondary	Upper Secondary	Technical Education
MMWPv	5856.12	6920.00	8024.88	7156.88	3688.08
MMWPU	880.36	714.68	1725.68	2541.96	2539.2
Effect	4975.76	6205.32	6299.2	4614.92	1148.88

Source: Own calculation based on ENIGH 96

¹¹ Annual 1996 pesos

In addition to Least Squares Regression (LSR), quantile regressions were computed to test the robustness of the above results. The aim is to assess how large are the "savings" for various educational expenditure groups. Results of this test indicate that the distribution of "savings" might be right-skewed since the *MMWPU*, *MMWPv* and the savings effect, evaluated at the median of the total educational expenditure distribution, are lower than in the LSR. Note that at the median of the public educational expenditure distribution all explanatory variables are significant for explaining *MMWPU*. Yet, at the tails of this distribution, variables such as gender, number of children and schooling of the household head are not significant in explaining *MMWPU*.

Another observation is that at the median and lower tail of the private educational expenditures distribution, variables such as income, household head schooling and housing facilities are important to determine the *MMWPv*. At the upper tail of the distribution, household per capita income is the only relevant variable that determines *MMWPv*.

Table 33. Effect¹¹ of Public Schools Supply on Household Education Spending through out the Conditional⁴⁹ Expenditure Distribution

	Quantile 0.1	Quantile 0.25	Quantile 0.5	Quantile 0.75	Quantile 0.9
MMWPv	1101.48	2843.56	5781	16291.04	39533.6
MMWPU	16.52	252.12	1636.2	6241.2	12897.04
Effect	1084.96	2591.44	4144.84	10049.88	26636.56

Source: Own calculation based on ENIGH 96

¹¹ Annual 1996 pesos

⁴⁸ The analysis could not be done for tertiary level because there was not a "trigger variable" at this level of education.

⁴⁹ Conditional to Per capita income, Years of schooling of head, Area (*rural*), Age, Age squared, Gender, Number of rooms, Type of Floor, Sewage, Number of Children, Trigger Variable.

It follows from the above analysis and from table 33 that those households with a high level of educational expenditures receive the largest subsidy from public educational services. Given that there is a strong positive relationship between educational expenditures and per capita household income, a reasonable conclusion might be that the government should charge a fee to those in the upper tail of the income distribution especially considering that the wealthy individuals have both a high valuation for quality of schooling and are able to pay for the educational service

V. CONCLUDING REMARKS

- Enrollment rates for the educational levels beyond primary and lower-secondary levels are dramatically low, particularly for the extremely poor, thus resulting in an increase in the educational gap between poor and non-poor. Given that coverage at primary level and the first years of lower secondary is already sizable and that demographic pressure is decreasing, the population of this group is virtually stagnated and will start to shrink at the beginning of the next century. This in turn frees some public resources, which can eventually be used to increase coverage at the upper-secondary level.
- It was shown that the enrollment rates for secondary and tertiary levels are extremely low, particularly for the poor. The probability of enrollment in secondary level is much higher for both the top 40% of the income distribution and for urban areas when compared to those in the bottom 40% of the income distribution and for rural areas. Head of household's educational level, household income per capita and government effort have a positive influence on the probability of enrollment. The variable government effort has a marginal impact which is many times larger for the 'Poor' as compared to for the 'Wealthy' (in elasticity terms, this variable is more effective for the poor by a factor of 12). The differential impact suggests that the goal of efficiency in terms of maximizing enrollments in secondary school does not have a trade-off with the goals of greater equity of educational opportunity. Indeed, these findings indicate that increases in enrollment will be more readily obtained if resources are successfully targeted towards the poorer income group.
- Government spending per student steadily increased until 1994 and stayed the same until 1995; peaked again in 1998. On the other hand, after 1994, government spending per student became better distributed. Nevertheless, government spending still favors tertiary education. Spending on education continues to be concentrated in the federal sector, which accounts for over 80 percent of total sector spending.
- Another noteworthy observation about the evolution of public spending on education in Mexico is that it has become somewhat more egalitarian in per-capita terms across different schooling categories. By moving towards a more evenly distribution of per capita spending across different levels, equity seems to have improved. At the same time, the external environment changed in a manner that raised the relative returns to higher education, thereby tending to make more efficient what had initially been an inefficient allocation of resources.
- With respect to the public educational expenditures by income strata and region, using the unit cost per student by state and educational level, the results indicate that at national level the poorest income groups receive the bulk of primary education subsidy (federal plus state expenditures). This same group, at higher levels of education receives progressively smaller subsidies and the pattern changes across regions. In the North Region, primary education is almost neutral (benefits equally all income groups) and regressive (benefits high-income groups) for other levels of instruction. In the Central Region, primary schooling benefit the low income groups while lower secondary is almost neutral. Upper secondary and tertiary instruction benefit the richest income deciles. In the South Region, basic education benefits the bottom income groups, upper secondary is neutral and tertiary education level benefits the top income groups. In Mexico City, the cumulative distribution at all levels of education, except primary, highly benefits the high income groups.
- Public expenditure at the tertiary level is more regressive than the pattern of household expenditure. A large share of public resources given to this level of education tends to favor non-poor students in urban areas. *A strategy to reallocate* the education public expenditures from a higher to a lower level of instruction in order to favor the poor groups, *would have to*

involve the development of higher educational credit markets. Meaning that, the government's appropriate role could be to help overcome market failures in the financial sector, which limit the availability of long-term finance for investments in higher education. These failures can be corrected through student loan programs, or means-tested financial aid and scholarship programs. These programs are rarely devoid of subsidy components, but they are preferable to a direct, cost-free provision of services because the subsidy is more closely targeted to the source of market failure. (Chapter 3 has a brief discussion on this).

- The total cost (student expenditure plus government subsidy) per student in primary public school corresponds to about 35% of the private primary school cost. For students in lower and upper secondary it represents 43% and 53%, respectively. On the other hand, the cost of tertiary level is 13% higher in public schools as compared to private (see tables below). An interesting question that arises is why the cost at tertiary level is higher in public than in private schools. Is it because the subsidy is not being used efficiently, or because the infrastructure (research institutes, libraries, museums, entertainment centers, etc.) they offer is costly?. In the next section a technique is applied that will allow us to evaluate the impact of public expenditures on household spending patterns.
- The benefit-incidence analysis assumed that the subsidy and the quality of education are uniformly the same for all income deciles. This is a strong assumption that tends to minimize the distributional inequity within educational levels. The marginal willingness to pay analysis prevents this drawback. This methodology measures the effect of the government provision of public schools on the educational spending behavior of an average household. The results suggest the following: i) the non-poor and those in urban areas get a large share of the subsidy or "savings" from the government provision of education services. ii) The valuation for private educational services is higher for the wealthy as compared to for the poor. And, iii) quality differences are higher in primary level. In light of these results, plausible alternatives for the government include i) to better target public educational services; ii) charge a fee for public educational services to the non-poor; and iii) increase the quality of education in basic education.
- The public education system can improve its targeting to the poor *by increasing its focus* on the secondary (lower and upper) levels versus university levels, especially technical education. The later is of special relevance since as shown on Chapter 1, the skills or knowledge acquired through technical education after completing lower-secondary level is a key factor in the formation of earnings.
- Preliminary evidence suggests that the burden of educational expenditures on poor households is high. This finding suggests that actions aimed at increasing the participation of poor children should comprise subsidies for secondary textbooks, scholarships for transports and schools materials, to reduce the burden on other schooling costs (i.e., unforeseen expenditures).

Chapter 3

Educational Policy in Intermediate and Tertiary Level of Education

It has been shown in previous chapters that rates of return to education for basic educational levels have not changed significantly in the last ten years. Conversely, the rates of return to education for upper secondary and university educational levels have increased dramatically. In addition, the enrollment rates both for upper secondary, and for tertiary education are too low, i.e. while primary and lower secondary educational levels show high enrollment rates (about 95 and 60 percent for primary and lower secondary respectively), high-educational levels display much lower enrollment rates (about 36 and 12 percent for upper secondary and university respectively). Moreover, household head's age, his schooling, his sector of activity, household per capita income, and government effort seem all relevant variables in explaining the probability of enrollment in upper secondary (a requirement to reach tertiary education). Hence, the interaction of educational demand factors and educational supply factors determines school enrollment.

In light of the above results, a natural step is to investigate some specific educational policy aspects, which may have a significant impact on the individual's decision-making of whether to continue or not studying. This decision-making will bring a change in the skilled labor supply, and then a change in the earnings of skilled labor relative to unskilled labor. Consequently, a change in earnings distribution may occur. Finally, since there seems to be a problem with enrollment for higher educational levels, this part will examine such specific educational policy aspects particularly for upper secondary and university educational levels.

This chapter addresses the following questions: What is the structure of upper secondary and tertiary education in Mexico? What is the enrollment rate for these educational levels? How do these numbers compare with other countries? What is the quality status of students that have finished lower secondary educational level and want to reach higher educational levels? What are the program options that these students have? Is this information readily available or fully disseminated? Can students from low-income families get any credit or loan to finance their higher education in Mexico? What is the international experience in this respect?

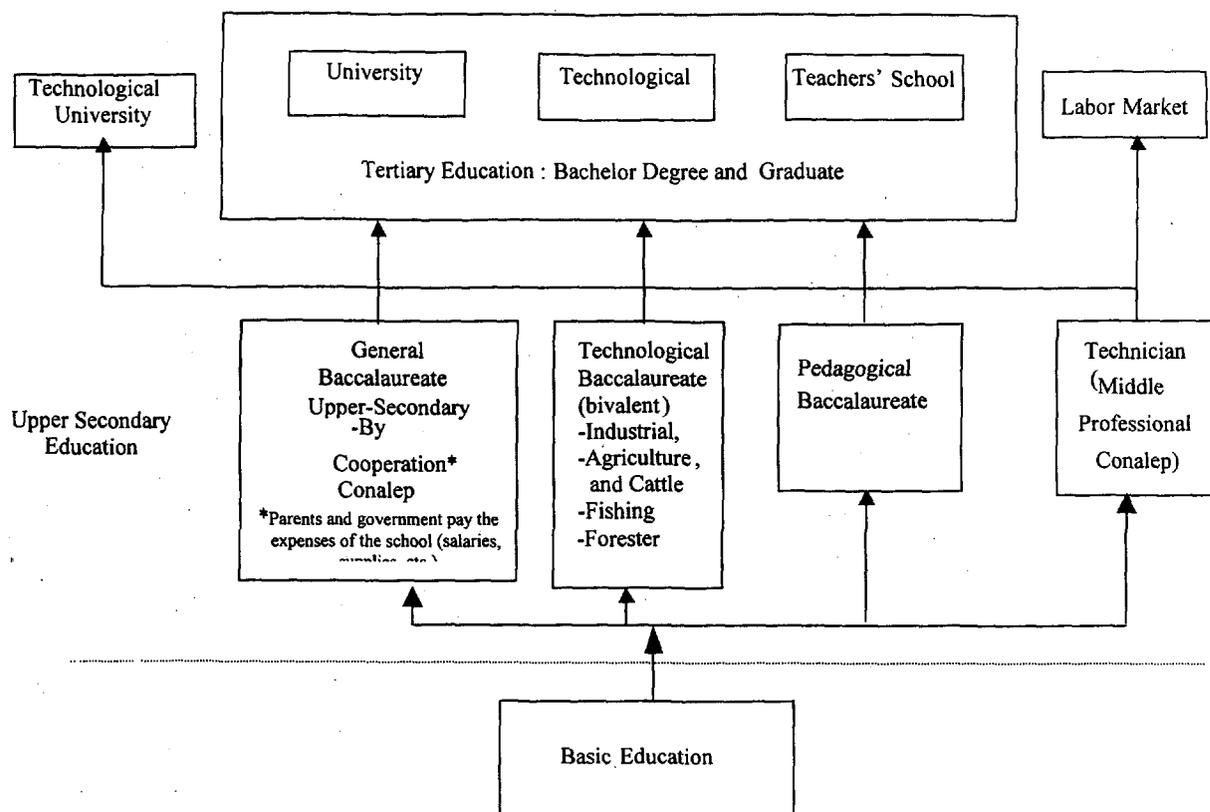
Thus, this chapter is structured as follows: Section I covers the system organization, length of studies and enrollment. Section II examines the quality of education in upper secondary and tertiary instruction; it also describes the process of professional quality certification, as well as procedures and criteria used to assign places. Section III examines the dissemination of study programs, the limited promotion of study programs, their contents, and curricular diversity. Section IV analyzes the available grants or financial support for upper secondary and tertiary schooling and scholarships' assignation criteria in public and private schools. Finally, Section V presents the concluding remarks.

I. UPPER SECONDARY AND TERTIARY SYSTEM ORGANIZATION AND ENROLLMENT RATES

Upper Secondary System Organization and Enrollment Rate

The age group, which typically attends upper secondary education, is from 15 to 18 years old. Upper secondary education includes General Baccalaureate, Technical Baccalaureate and Pedagogical Baccalaureate, as well as professional education not requiring upper-secondary degrees (technicians). On the other hand, while general curriculum provides studies in all areas of knowledge, technological curriculum provides, in addition to the general baccalaureate education, training as a technician. Figure 10 shows this upper secondary educational structure.

Figure 10 . Structure of Upper Secondary and Tertiary Schooling



The upper-secondary is classified according to its type of service in:

General or Propedeutical

(2 and 3 years)

- Preparatory
- By cooperation
- Pedagogical
- Tele Upper-Secondary
- Of Art

Technological (bivalent equal to baccalaureate and technician)

- Industrial
- Agriculture and cattle
- Fishing
- Forester

Programs and study at this level take from two to three years, depending on the program and the type of institution. Once the studies are completed a certificate is obtained. This certificate permits the student to continue into tertiary education level. At upper secondary there is a bivalent option, which allows students both to be certified as a middle professional technician and to have access to the labor market.

The general upper secondary widens and consolidates lower secondary education and prepares the student to choose a professional career. As shown on figure 10, the upper secondary education level allows access to tertiary education, either the Bachelor Degree (Teacher's School, University and Technological) or Higher Technical Degree (Technological University), the technician being inserted into the labor market.

**Table 34. Enrollment in Upper Secondary Education by type of school 1997
(Upper-Secondary and Middle Professional)**

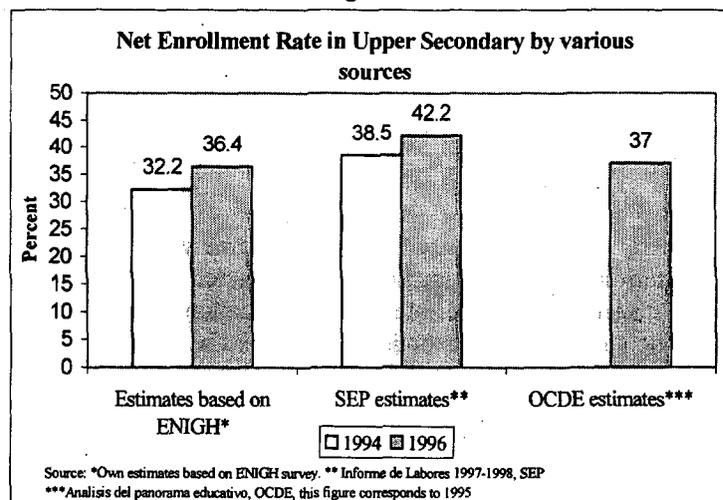
Support	Enrollment	Percentage enrollment
Federal (SEIT, SESIC)	1,015,636	39%
• General Upper-secondary	20,781	0.8%
• Upper-secondary by cooperation	68,441	2.6%
• Preparatory	83,946	3.2%
• Technical Upper-secondary	597,416	22.9%
• Technician (CETIS and CBTIS)	45,073	1.7%
• Technician CONALEP	197,906	7.6%
• Technician (Others)	2,073	0.08%
State	703,515	27%
Autonomous (University)	374,201	14.3%
Private	512,747	19.7%
Total	2,606,099	100%

Source: SEP, "Compendio Estadístico por Entidad Federativa 1997", DGPPP.

Upper secondary level is covered by federal, state, autonomous and private educational institutions. Table 34 shows that public schools covered 80.3 percent of enrollment in 1997. On the other hand, it is important to note that the general upper-secondary education is administered under the care of the Under Ministry for Tertiary Education and Scientific Research (SESIC), while the technical upper secondary education is administered by the Under Ministry for Technological Education and Research (SEIT).⁵⁰

With respect to the student body, figure 11 shows the enrollment rate for the upper secondary level from various sources.⁵¹ As it can be seen all estimates are between 32 and 40 percent. Additionally, both ENIGH and SEP estimates present the same tendency: an increase in the enrollment rate from 1994 to 1996. Although there has been an improvement on this issue, one has to put this in an international context.

Figure 11

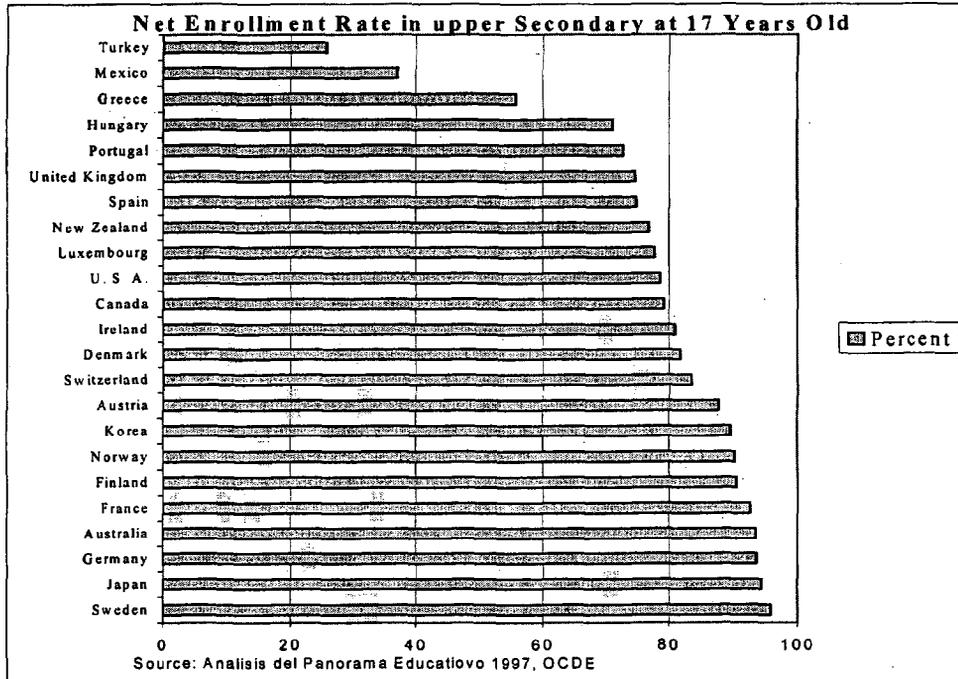


⁵⁰ Autonomous and State Universities also offer the service.

⁵¹ In the ENIGH estimates the age group is 15 to 17 years, while in the SEP estimates is 16 to 18. OCDE estimate includes only the group of 17 years old.

As it is shown on figure 12, while the highest income countries have an enrollment rate of 75 percent or higher, Mexico is rated as being last in place, just before Turkey. These results point out to an educational deficit in the production of potential graduate students.

Figure 12

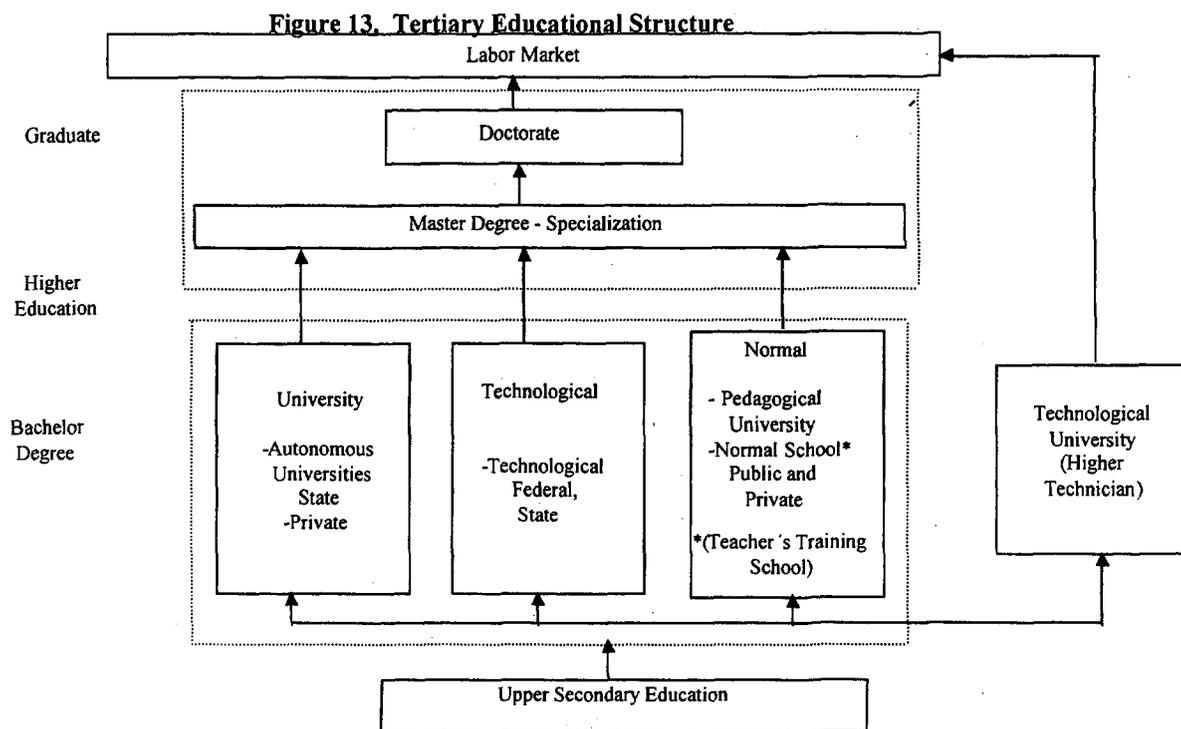


According to the Informe de Labores (1997) from Sep, in 1997 1.25 million of students graduated from lower secondary education and 1.18 million registered in upper secondary for the school cycle 97-98. Thus, 94.4 percent of the graduates from lower secondary education continued to upper secondary level. However, this conclusion is unwarranted since table 27 in chapter 2 shows that the probability of enrollment to upper-secondary level is about 66 percent at national level and only 39 percent in rural areas⁵² (for more details see background paper 4, section 4).

Tertiary Educational System Organization and Enrollment Rate

Tertiary education is accessible after upper-secondary or equivalent studies. Instruction is provided by universities, (autonomous, state or technological); technological institutions (federal or state), teachers' schools (teacher's training) including studies at bachelor degree level, graduate (specialty, master degree and doctorate) terminal options before the bachelor degree (higher technical, specialty) and normal education in all its levels and specialties. Figure 13 shows the tertiary educational structure.

⁵² The probability being modeled is enrollment in upper secondary school for individuals age 15 to 19 and conditional to lower secondary completed.



The age group attending tertiary education is from 19 to 24 years old. This educational service is administrated by SEIT for Federal Technological and State Institutes. Autonomous, State, Technological and Private Universities also offer tertiary education services. According to the "Informe de Labores 1997-1998", 26.5 percent of enrollment, equivalent to 458.6 thousand students, attended private institutions (see table 35). The remaining, 1.26 million, were distributed in public institutions as follows:

Table 35. Public Enrolment in Tertiary Education 1997-1998
Normal, Bachelor and Graduate

Institution	97-98
Autonomous Universities*	799,600
Technological Institutes	196,700
Technological Universities	11,800
Normal School	145,800
Other tertiary education institutions	115,000
Total Public	1,268,900

Source: SEP "Informe de Labores 1997-1998"

*Includes Universities of Guadalajara, Guanajuato and Veracruz

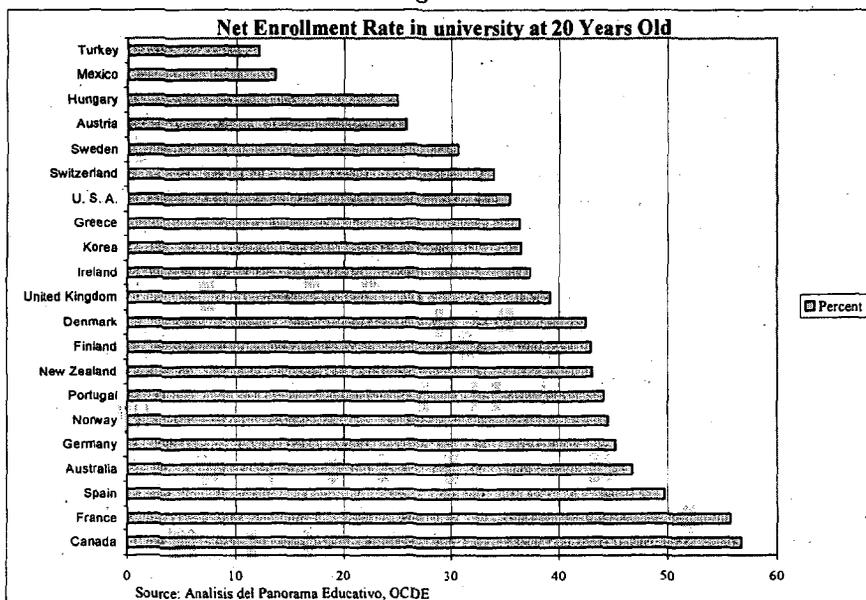
With regards to enrollment rate, this educational level has displayed a very low performance, i.e. given that the national population for this age group was 11.51 million (CONAPO) and the enrollment of tertiary education for this same age group was 1.168 million of students in 1997, consequently the enrollment rate just reached the 10.1 percent in that year⁵³.

Alternatively, the Mexican position in relation to other countries in this educational level is not much better. Figure 14 shows that the enrollment rate in the highest income countries is 2 or 3 times Mexico's enrollment rate for tertiary education. Moreover, since the Mexican economy is ranked as a middle-income country and the average enrollment rates for tertiary education in

⁵³ This percentage is lower than the one obtained in section II of chapter 2 because the age group considered was those in the 18-24 age range.

OCDE countries and in middle-income countries are 51% and 21%, respectively⁵⁴, we can conclude that the service coverage in Mexico in tertiary education has shown a very low performance.

Figure 14



II. THE QUALITY OF EDUCATION AND ACCESS TO UPPER SECONDARY AND TERTIARY EDUCATIONAL LEVELS

The quality of education might play an important role in earnings distribution because of several reasons. One of them is the quality level in basic educational services, which might facilitate the entrance into higher educational levels. This factor would perform negatively if there were significant differences in the quality of education among schools and generations. Hence, these differences could become an institutional restriction in order to enter higher educational levels, thus having an effect on earnings distribution in the medium and the long run.

Another reason is that the differences in the quality of education in upper secondary and tertiary education may emerge at the end in the labor market, both in the medium and in the long run. In other words, the higher the differences in quality of education, the greater the differences in productivity among individuals, and, therefore, a change in the earnings distribution may occur⁵⁵.

In order to evaluate the quality of educational service in upper secondary and tertiary levels, some indirect indicators can be used. Table 36 shows such indicators, which are failing, desertion, terminal efficiency (number of students finishing upper-secondary in the time required), student/group and student/teacher indexes, which give an idea of the educational quality in upper-secondary.⁵⁶

⁵⁴ The World Bank Group (1995).

⁵⁵ For a review of how public policy can affect the household decision-making regarding the quality of educational service differences, see section IV in Chapter 2.

⁵⁶ The COSNET, in a survey carried out in 1995 with 50 Technological Institutes, found some relevant problems associated with the quality of education. The most important are: (i) failing, dropouts and low terminal efficiency; (ii) poor teachers' education; and, (iii) low academic level of newly registered students.

Table 36. Failing, Desertion and Terminal Efficiency in Upper Secondary 90-97

School Cycles	90-91	91-92	92-93	93-94	94-95	95-96	96-97 e
Total Enrollment (Thousands)	1,721.6	1,725.2	1,767.0	1,837.6	1,936.3	2,050.6	2,157.8 ⁵⁷
Absorption Percentage of Lower Secondary School Graduates	61.0	62.2	63.7	65.8	71.1	74.1	72.3
Failing	47.6	43.5	46.6	44.5	44	44	44
Terminal Efficiency (Traditional method)	57.0	57.0	57.4	57.1	57.2	56.7	57.1
Dropouts	16.4	17.4	15.7	14.6	16.6	16.6	16.8
Student/Teacher	15.7	15.3	15.3	15.2	15.0	14.8	14.9
Student/Group	39.4	38.0	37.7	37.1	37.1	36.9	36.9

e Estimated Source: SEP "Informe de Labores 1996"

One of the aspects that may have a positive or negative effect on educational quality is the number of students per group as well as per teacher. Regarding this, for the 1996-97 school cycle, the average number of students per group was 37 and the average number of students per teacher was 15. These could be considered as acceptable, according to the maximum number of students recommended by the SEP (40 and 28 respectively). However, other indicators have a poor performance: failing is high, 44 percent, compared with failing in lower secondary that is 23 percent; the dropout rate is 16.8 percent and the terminal efficiency, 57.1 percent, is low. All these indexes may be a sign of the low background level of students when they enroll into this level of education and/or a doubtful educational quality from the institution.

For tertiary education, the SEP has only statistical data regarding dropout rates, which are shown in table 37. As it can be seen in such table dropout rates do not show a clear trend (i.e. increase or decrease). However, if we compare 1995-1996 with respect to 1997-1998 there is a clear increase in the dropout rate for all tertiary educational levels.

Table 37. Dropout in Tertiary Education

School Cycle	Teachers School	University And Technological	Graduate	Tertiary (All levels)
1995-1996	8.2%	4.3%	N.A.*	4.7%
1996-1997	3.8%	7.5%	5.0%	7.1%
1997-1998	4.8%	7.1%	8.5%	6.8%

Source: DGPPP 1997

*N.A.= Not available

Another way to evaluate the quality of education is through some direct outcomes, for instance, exams in order to assess the students performance. Regarding this, the only information available are the results of EXANI-I exam, which are generated by The National Evaluation Center for Tertiary Education A.C. (CENEVAL). This exam is a requirement for enrollment into upper secondary education. It is applied in the Metropolitan Area of Mexico City and in 157 institutions through out the country (except for SEIT institutions). The criteria for assigning a place are to have a general average minimum proficiency (6 or 7 out of a 10 scale) and to answer correctly at least 31 out of 128 questions on the EXANI-I examination. The EXANI-I is structured as follows: 24 for verbal skill, 24 for mathematical knowledge and 10 for each area of learning in Spanish, History, Geography, Civism, Mathematics, Physics, Chemistry and Biology.

The Council of the National System of Technological Education (COSNET) applies other tests in the SEIT schools to measure students' formal reasoning and the ability to learn mathematics. In addition, each institution designs its own proficiency examination. The "technological" area applies as criterion 7 points in the learning examination (in a 0 to 10 scale) and a minimum 18 correct answers out of 32 in the over-all knowledge examination and 12 correct answers out of 24 in the test to assess capacity for learning mathematics. SEP refers in the

⁵⁷ In the ENIGH 96 there were 2,767.9 thousands enrollments in upper secondary.

“Informe de Labores 1997-1998” that 234,925 students took the examination. Of them 3,231 (1.3 percent) were rejected, not having the knowledge and capacities requested, by the institutions, to enter upper secondary education. Table 38 shows the results of these examinations for the 1992-1993 and 1993-1994 cycles.

Table 38. The COSNET Examination Results

Examination	Minimum Required	DGETI ^{1/}		DGETA ^{1/}		UECyTM ^{1/}		Total Average	
		92-93 cycle	93-94 cycle	92-93 cycle	93-94 cycle	92-93 cycle	93-94 cycle	92-93 cycle	93-94 cycle
Capacity for formal reasoning	56.20%	33.06%	36.25%	31.50%	31.25%	33.00%	31.25%	32.21%	34.37%
Capacity for mathematical learning	50.00%	47.00%	39.58%	36.90%	33.33%	44.00%	37.50%	45.70%	37.50%
Learning examination	7.00	5.17	n.a.	4.86	n.a.	4.70	n.a.	5.03	n.a.

^{1/}General Direction of Technological Industrial Education (DGETI); General Direction of Technological Agriculture and Cattle Education (DGETA); Educational Unit of Science and Technology of the Sea (UECyTM).

In the learning results of 92-93 and 93-94 school cycles, table 38 indicates that on average the candidates admitted did not obtain a 7 in a 0 to 10 scale. Despite this just 11.5% and 10.9% of the students examined were rejected⁵⁸

The CENEVAL applies the EXANI-II at national level (including the Metropolitan Area of Mexico City) as an examination for admission to tertiary education. Tertiary institutions design their own examinations including 120 questions, as per the menu offered by CENEVAL, starting with a common module which includes questions comprising verbal and mathematical reasoning; contemporary world knowledge, natural science and humanities, mathematics and Spanish. This is followed by specific modules covering knowledge of mathematics, biology and health sciences, physics, chemistry, Mexico’s geography and history, humanities, literature and advanced Spanish, law, administration, social sciences and English. According to data from the 1997-1998 CENEVAL report, the examination was applied to 126,124 candidates in 94 institutions. There have not been any public statistical data on the results of this level, therefore the academic criteria of acceptance into these 94 institutions are not known. The CENEVAL promotes and applies a “General Examination of Professional Quality” (EGCP) at tertiary education institutions, but few have decided to incorporate this examination to their professional degree requisites.

In summary, there are two factors that do not permit the institutions to retain their students. The first one refers to the low academic level of pupils entering the upper secondary education (as shown by the COSNET examination). And secondly, the poor educational service (terminal efficiency of 57.1 percent) of these institutions compared to basic education.

Access to Upper Secondary Level

At present there is no official information on the total places available to candidates for upper secondary educational institutions. This allows institutions to accept a different number of candidates in every registration period. The available places or each institution’s capacity is linked to the teacher/student ratio, the resources available for operating workshops and laboratories, and the number of school teachers, among other factors. Based on the dimensions of classrooms, the SEP’s recommendation is to have a minimum of 40 teacher/student ratio and the authorized budget depends on the GDP of the country and the appropriations that the congress authorizes for education. As in upper secondary education, in tertiary education there is a set of norms for place assignation. These norms request some knowledge and skills from the precedent

⁵⁸ The number of candidates who took the examination were 246,316 and 250,254, in 1992-93 and 1993-94 cycles respectively from which 218,078 and 222,927 were accepted in each cycle.

educational level and a certificate attesting previous termination of an educational level of studies.

The admission tests by area of learning are announced through a poorly informative campaign, which basically states the names and careers. It is important to know that, as in the upper secondary level, the total available capacity for each career in Tertiary institutions is not known. This phenomenon is aggravated by the fact that some tertiary institutions also provide upper secondary education and allow their graduates to enter the tertiary level through an automatic or regulated pass.⁵⁹ For example, in the Metropolitan Area of Mexico City, the places available in the UNAM, the National Polytechnics Institute (IPN) and the Metropolitan Autonomous University (UAM), are usually never officially stated and this might allow for discretionary action in the selection process and place assignment.

Access to Tertiary Educational Level

About the procedures for new admissions, the tertiary educational level faces the same conditions and situations as upper secondary educational level. An example of this is the UNAM's note published in the newspaper "Reforma" on Sunday May 16, 1999. This note informed the pre-requisites, dates, career space availability, campuses, and the places assigned in the previous selection examination (June 1998). Once this has been obtained, they use it as reference in order to select the career and school where they want to attend.

III. DISSEMINATION OF THE AVAILABLE STUDY PROGRAMS AND DIVERSITY IN THE CURRICULA

The student's decision-making of what career she or he wants to or should study is clearly influenced by several factors as tastes, abilities, family background, information available, etc. Some of these factors are intrinsic to each particular student, and others can be used as policy tools in order to advice students of the best study option to take. In this regards, information available plays an important role on school completion, since it allows students to make their own choice of study compatible with their particular interests and available study opportunities.

Regarding this, outside the Metropolitan Area of Mexico City the promotion of programs for upper secondary level and their contents is very limited. In Mexico City, the COMIPES attempts to identify those professional careers, which can be studied in the upper secondary education, admission pre-requisite, support to vocational orientation through visits to the specific educational institutions. In the rest of the country, local newspapers publish information regarding public and private institutions their dates of test, kinds of upper secondary education and pre-requisites required. This information is the only one available for students and parents regarding upper secondary educational options.

Upper secondary education schools provide vocational orientation services. In some instances, at the students request, a study is carried out in order to assess their capabilities and skills. This might help those students who have problems with selecting a professional career. Most tertiary educational institutions do not promote themselves and they assume that the academic prestige will entice applicants. Generally, private institutions advertise their services, and highlight the advantages of studying with them. However, these campaigns usually give very little information about their study program contents.

In tertiary educational level, there has not been any effort made to promote study programs nor have their contents been accurate, nation wide, because tertiary education schools conduct

⁵⁹ Annex 7 indicates the criteria for the assignment of places.

very limited upper secondary school campaigns on careers offered, academic contents and job areas become accessible at the end of their careers.

For upper secondary education level, there is a great diversity in the curricula; 300 programs according to the Organization for Economic Cooperation and Development (OECD) in the National Policies Report published in 1997. Student options are further complicated by the five administrative and normative areas (SEIT, SESIC, States, Autonomous Universities and State Universities), which not only make it more difficult for the potential candidate to choose an adequate option in accordance with his/her abilities but also complicates the process of eventual attendance due to the problems regarding the revalidation of studies.

As shown on table 39, general upper secondary differs from bivalent technological upper secondary schools mainly by the number of educational work hours (theory and practices in workshops, laboratories, companies) leaving out the number of theoretical study hours, which makes them having more education instructional in common.

Table 39. Hours of Education for Work and Study

Institution	Hours of Theory and Practice in Workshops and/or Companies	Hours of Theoretical Study
Colegio de Bachilleres (Upper-secondary College)	6 in 3 rd and 4 th Semester 10 in 5 th and 6 th Semester	27 average
Conalep	17 average in 1 st Semester up to 70% class hours weekly	33 average
Centros de Estudios de Bachillerato (Centers of Baccalaureate's studies)	14 in 5 th and 6 th Semester	26 to 29
CBTA	11 average	23 average
CBTIS Y CETIS (Upper-secondary)	11 average	23 average
CBTIS Y CETIS (Technical)	24 average	10 average
CECYT (IPN)	13	27
Colegio de Bachilleres (Upper-secondary College-State of Mexico)	14	17 a 20
CECYT (State of Mexico)	15 average	21 average
Centros de Bachillerato Tecnológico Technological Upper-secondary Centers- State of Mexico)	13 a 14	26 a 27
Enfermería (Nurse Training School) (Technical UNAM)	32	12
Preparatory School (UNAM)		30
Colegio de Ciencias y Humanidades (College of Sciences and Humanities)(UNAM)		28
Preparatoria, Universidad Autónoma del Estado de Mexico (Preparatory from the Autonomous University of the State of Mexico)(UAEM)		37
Preparatorias Oficiales y Anexas a las Normales (Official Preparatories and Attached to the Teaching Schools) (State of Mexico).		36 a 38

Source: COMIPEMS 1998. CONALEP; CBTA; CBTIS; CETIS; CECYT.

The SEIT and the IPN in the Metropolitan Area of Mexico City offer 125 specialties, from which 70 have a technical level and 55 are of bivalent upper-secondary. At national level the supply by institution is:

Table 40. Number of Specialties by Institution

Institution	Number of Specialties	Type of Studies
CONALEP	29	Technical Professional
DGETI (CETIS, CBTIS)	42	Technical Professional
	12	Bivalent Upper-secondary
CETI. Techno-Industrial Teaching Center (Centro de Enseñanza Técnico Industrial)	12	Bivalent Upper-secondary
UECYTM (CETMAR and CETAC)	5	Technical Professional
DGETA (CBTA, CBTF)	18	Bivalent Upper-secondary
CECyTE'S. Scientific and Technological Studies' Center in the States (Centros de Estudios Científicos y Tecnológicos en los Estados)	48	Bivalent Upper-secondary

Source: COSNET 1997.

In this broad spectrum, we have to include the existing upper secondary two year-programs in Coahuila, Nuevo León, San Luis Potosí and Tamaulipas, provided by the Autonomous Universities of those states, in which service to 94,627 students is given (4%) of a national total 2,323,069 in 1997. There is great curricular diversity for the upper secondary levels both of technical and general type. Should be important to compare the contents and programs in order to outline the differences and find the common points to assess the curricula diversity optimum.

The tertiary educational institutions also have a wide curricular diversity and offer 323 specialties or professional careers. The great majority are graduate and engineering studies grouped in 6 learning areas.

Table 41. Number of Specialties by Learning Areas

Learning Areas	Number of Specialties	Percentage of the Enrolment
Agriculture & Cattle	45 specialties	3%
Of Health	25 specialties	9%
Exact and Natural	23 specialties	2%
Social and Administrative	81 specialties	51%
Education and Humanities	46 specialties	3%
Engineering and Technology	103 specialties	32%
TOTAL	323 Specialties	100%

Source: Anuario Estadístico 1997, ANUIES.

In 1997 the social and administrative sciences area had the higher demand (33.9%) as shown in annex 7. Public schools covered 76% of the demand, while private schools covered 24% of it. Out of 76%, 56% of the students were enrolled in universities, 18.2% in technological institutes of the SEP and 1.8% in other public schools (ANUIES 1997).

In tertiary education, each specialty requests an upper-secondary instruction oriented towards that area of learning and the great diversity of careers presents a wide range of pre-requisites for the bachelor's degree. Such situation might create a problem for the student who wishes to change his field and may need to reassign his/her upper secondary studies. In other words, a series of revalidation procedures and acknowledgment of studies could force the student to start again. On the other hand, curricula diversity could enrich student's decision and allow him/her to insert in the job market more easily.

IV. CREDIT AND FINANCING EDUCATION

This section reviews scholarship coverage at upper secondary and university and examines whether these scholarships are targeted to students with academic abilities, but with low

family income. In particular, this section briefly examines the financial support for supplying educational services to higher education as well as financial assistance to individuals who are in higher education. We examine government and other institutions' financial assistance to individuals, i.e. characteristics and allocation of public and private scholarships in upper secondary and tertiary instruction level.

IV.1 SUPPLY-SIDE FINANCING OF HIGHER EDUCATION SERVICES

In most countries, public institutions are still providing the major percentage of total tertiary education supply (World Bank 1995). In Mexico, public institutions provide most of the supply to higher education, 80.3 and 73.5 percent in upper secondary and tertiary education, respectively in 1997⁶⁰. Thus, the upper secondary and tertiary educational supply depends primarily on public financing.

Because the enrollment rates for upper secondary and tertiary education are low, the apparent public institutions' efforts along with their high relative participation in the educational supply services do not seem to be enough. This fault can be partially explained by the fact that Mexico, as almost all less developed countries (LDC's), have reduced their financial support to educational services within higher education, since the country has had to face its economic crisis by reducing its fiscal expenditures, among other economic policy tools.

In other countries, the previous phenomenon has lead upper secondary, tertiary schools to find other financial alternatives. For example, external transference (from ex-alumni or other private agents) and some generated income activities, such as short courses, technical assistance to private firms, etc. (World Bank 1995).

Another way to solve the lack of financial support to supply educational services at higher educational levels is to allow and promote the private institutions participation in this market. One advantage of private institution participation is due to the fact that these institutions are more flexible regarding changes in the demand. However, as it will be analyzed in the next section (from the demand side), there are economic justifications not only in the government's financial assistance participation for higher educational services, but also to increase this participation. This is basically due to the social benefits generated by higher education (basic research, technology development, etc.) and by the inherent imperfections in capital markets.

IV.2 DEMAND-SIDE FINANCING OF HIGHER EDUCATION SERVICES

On the demand-side for higher education, capital market imperfections limit individual form getting loans to finance their education, specially those individuals with middle or low income. We can address two types of problems in order to find some answers to the question of why the financial private sector might not provide educational financing. On the one hand, if there were no imperfect-information then individuals with high abilities and academically qualified would be able to get loans in order to finance their education, due to their high rate of return. However, imperfect-information like adverse selection and moral hazard bring credit constraints on financing education. On the other hand, if the financial sector chose the second best option (i.e. signing contracts) then the financial sector should be working on an efficient and transparent manner in order to be able to finance any kind of investment on education.

In Mexico, the private financial sector seems to have both problems. The first one is inherent to a general point of view of imperfect-information models. The second one is the most

⁶⁰ Informe de Labores 1997-1998, SEP.

pernicious. The country's financial sector has suffered several institutional changes (nationalization in 1982 and privatization in 1991-92). Additionally, the financial sector faced a full-fledged crisis in 1995, which led to a domestic credit crunch. Given this scenario, the private financial sector has not been able to finance any educational investment (human capital), and will probably not do in the near future.

Thus, since the Mexican private sector is not able to finance higher education, public institutions should play a central role in this issue. Hence, in order to finance higher education for needy students, some government financial assistance programs have to be designed. Some alternatives are: (i) Fixed Repayment Loan Scheme. Covering tuition or student living expenses, this loan will be repaid through subsequent earnings after graduation; (ii) Income-Contingent Loans. The repayment of these loans will be fixed proportions of a graduate's annual income; and, (iii) Grants and Work-Study Schemes. In this scheme the public institution guarantee access to academically qualified low-income students (The World Bank, 1995)

Experiences, up to this date, with existing loan schemes in some fifty industrial and developing countries have been disappointing, i.e. in some cases the programs either have had poor financial performance or are quite small in scale. Despite the poor performance of many other loan programs, the experience of the Colombian and Canadian province of Quebec programs show that it is possible to design and manage financially sustainable programs. The Success of the Colombian program resides in its decentralized structure (there are twenty-one regional offices, each one manages its own portfolio, appoints its own staff, allocates its own budget, and develops a regional student loan trust fund (The World Bank, 1995).

In Mexico, government, through the Ministry of Education (SEP), and some private educational institutions provide financial assistance for upper secondary and tertiary students. With regards to upper secondary, financing is achieved through scholarships which cover 100% registration fees (private schools) scholarships and financial support, from the Ministry of Education in order to reduce drop-outs and failing grades.

Table 42. Public Scholarships Granted 1997-1998

Level	Scholarships Granted	Monthly Amount (pesos)
Upper Secondary	49,831	\$ 270.90
Tertiary	17,616	\$ 325.10

Source: Dirección General de Acreditación, Incorporación y Revalidación (DGAIR) SEP, 1997.

In 1997 public institutions, as per Table 42, granted 49,831 scholarships to upper secondary education students, which represents 4.19% of the total enrollment. This was done to reduce the drop out and failing grade indexes. In each public school, a scholarship committee or technical board (teachers and director) selects scholarship holders in accordance with an application stating the general proficiency average of 8 or 8.5. In addition, it is requested that the student get a socioeconomic study made and not have a brother or sister hold a scholarship granted by the SEP (one scholarship per family).

Financial aid is paid twice a year and its monthly installment is 270.90 pesos (230.2 1996 pesos). From chapter 2, fees, tuition and unforeseen expenses paid by an average individual enrolled in public upper secondary instruction level represent 38.3% of the public scholarships granted in upper secondary level and 32% for a moderately poor individual. Textbooks, stationery, etc, represent 25.2% of the public scholarship grant. This in turn suggests that SEP could lower the amount given for scholarships and target them to the poor. Thus, increase the number of students eligible for scholarships based on academic achievement regardless of parenthood.

In 1997, private upper-secondary schools covered 512,747 students. According to a circular issued May 24, 1992 by the Under-Ministry of Educational Coordination, scholarships

had to be granted to a minimum 5% of this enrollment. The scholarships covered 100% registration and tuition fees.⁶¹ Private schools can increase the number of scholarships by reducing the percentage of expenses covered (if the scholarship is granted to 10% of the enrollment the scholarship covers 50% of expenses).

This circular states that a scholarship committee, formed by directives and parents in private schools, selects scholarship holders in accordance with an application stating, the general proficiency average; 8 as minimum and a socioeconomic study providing the family's low income.⁶² Students receiving a scholarship, according to a circular of May 24, 1992, should not pay tuition. But in some cases they do some work to maintain their general proficiency averages of 8 as a minimum, and in addition not fail any subject.

With regards to tertiary education, the Ministry of Education granted 17,616 scholarships in 1997 in order to keep students in institutions and reduce the failing subject indexes (see table 42). The monthly installment was 325.10 pesos. From chapter 2; fees, tuition and unforeseen expenditures in tertiary school level represent 64.6% of the public scholarship grant in tertiary level (276.2 pesos of 1996) for an average individual and 24.7% for a moderately poor individual. textbooks, stationery, etc, represent 21% of the public scholarship grant.

Public and private institutions follow the same mechanisms to grant scholarships as mentioned above. When the percentage of academic scholarships does not cover 100% of the registration costs or tuition fees, private educational institutions grant their students credit. These students pay after having finished their studies.⁶³

In parallel to the general financing support granted in upper secondary and tertiary schooling levels, the government established a demand-side higher education financing project in Mexico. This financial assistance program was begun in 1998 and its specific goals are i) improving access to higher education for qualified but financially needy students, and ii) developing a more effective and financially sustainable student loan institution. This program is currently being applied in the State of Sonora, Mexico. The student loan will be executed by two agencies, Sonora Student Loan Institute (ICEES) and The Society for the Promotion of Higher Education (SOFES). SOFES will coordinate the development of the private sector student loan scheme component and ICEES will coordinate the component aimed at strengthening the Sonora student loan scheme. It is expected that at the end of the project SOFES will have provided loans to a minimum of 26,600 students, of which approximately 70% would come from middle-low to low income families, while ICEES would be providing credits to 21,000 students by the year 2002.

Component 1, which is administrated by SOFES, would be aimed at improving access to private higher education students who are academically qualified but whose financial conditions limit their opportunities for higher education. In the first phase of the program, the loans would only be used to cover registration, insurance and tuition fees. In the second phase, books and supplies, living allowances, and transportation would also be covered by the loan. The repayment term for graduating students would be double the study period for which the loan was taken, in addition to a six-month grace period.

⁶¹ Before said, average individuals paid, 624.60 monthly pesos (1996=100), for fees and tuition in a private upper secondary.

⁶² In private schools, there are also sport scholarships granted to students with an overly performance level in representative sports organized by the institutions. Some service clubs or foundations and enterprises, also grant scholarships as a service to the community or benefits to their employees.

⁶³ Insurance companies offer financing service for tertiary education. This service works as a combination of life insurance and academic financing insurance for the beneficiary upon covering the quotas. These costs make up the sum of a trust, which delivers annual amounts established upon signing the contract.

In component 2 which is administrated by ICEES the beneficiaries would be academically qualified, low- and middle-income students born or residents of the State of Sonora who were to enroll in a recognized public higher education institution. Each individual contract will cover a maximum study period of 12 months.

In the targeting strategy, both SOFES and ICEES are using the same methodology for classifying students by socioeconomic background.

Two remarks can be derived from the previous description of the financing assistance programs in Mexico. First, the financial support provided by the SEP and private education institutions faced two problems: centralized regulation and small coverage. Secondly, given that the successful of the Colombian financing assistance program resides in its decentralization and that the Sonora program seems to have the same nature, it is plausible to believe in its feasibility both in the short and long run terms. Then, it would be important to assess the status of the current *Sonora Program* in order to compare and take into account the characteristics of successful programs.

V. CONCLUDING REMARKS

The above analysis gives us a general view of the situation that upper secondary and tertiary education presents in Mexico, from which the following conclusions can be derived.

- *Coverage and Quality in Upper-secondary and Tertiary education.* Chapters 2 and 3 showed that enrollment rates for upper secondary and tertiary levels are extremely low, particularly for the poor. Moreover, Mexico's performance on this issue has been very low in an international context. Regarding educational quality services and according to its indirect and direct indicators, academic results are low and students have poor learning abilities. The funds assigned to improve the quality of tertiary education are insufficient with respect to the needs. In addition, there is a need for new rules to be agreed upon by the tertiary institutions and the SEP, in order to assign financial resources to ensure effective use of the money and provide information on academic achievements.
- *Information dissemination and curricula.* The student's decision-making of what career she or he wants to or should study is clearly influenced by several factors as tastes, abilities, family background, information available, etc. Some of these factors are intrinsic to each particular student, and others can be used as policy tools in order to advise students of the best study option to take. In this regards, information available plays an important role on school completion, since it allows students to make their own choice of study compatible with their particular interests and available study opportunities. Thus, insufficient effort from the part of educational institutions and the lack of information could not permit students to take their best option. Regarding the diversity on curricula, revalidation and lessening the numbers of specialties at secondary and tertiary levels should focus on contents of subjects rather than only on the course. This is so because many of the differences could be artificial, which impedes the transition from one program to another instead of providing mobility throughout the fields. On the other hand, curricula diversity could enhance student's vocational aptitudes. Thus, it becomes extremely important to assess empirically the net impact of curricula diversity on education attainment and transition.
- *Scholarships and grants.* In most countries, public institutions are still providing the major percentage of total tertiary education supply. Mexico is not the exception. However, both the public institutions' effort and their high relative participation in the supply do not seem to be enough. This phenomenon has lead upper secondary and tertiary schools in other countries to find some financial alternatives. Another way to solve the lack of financial support to provide educational services to higher education is to allow and promote the private institutions' participation in this market. One advantage of private institutions' participation is that these institutions are more flexible regarding changes in the demand. However, there are economic justifications not only in the government financial assistance participation for higher educational services, but also to increase this participation. This is basically due to the social benefits generated by higher education (basic research, technology development, etc.) and by the inherent imperfections in capital markets. Since the Mexican private sector is not able to finance higher education, public institutions should play a central role in providing financial assistance support to needy students. Hence, it would be convenient, in principle, that the government continues providing financial assistance to those students academically qualified but whose financial conditions limit their opportunities for higher education. However, this should be done in a different way. In other words, public funds should be reallocated in order to create a decentralized structure that would provide that kind of financial assistance, i.e. regional public agencies that manage their own resources. It might be preferable that the loan program be channeled through existing commercial credit institutions to ensure loan recovery, increase credibility and maintain cost-effectiveness.

- The analysis suggests that SEP could lower the amount of financing given per scholarship and target it to the poor or increase coverage. By doing so it would be possible to increase the number of students receiving scholarships based on academic achievement and economic background. In addition, it would be important to investigate the nature of the unforeseen expenditures paid by households with children enrolled in public schools.
- In addition to the problems outlined in this section, there are union problems that affect the quality of educational service. Upper secondary and tertiary education institutions face union pressures that make it difficult to impart service on time, thus affecting *quality*. All upper secondary education and tertiary educational institutions have a union of professors and administrative workers affiliated to the “Sindicato Nacional de Trabajadores de la Educación” (National Union of Education Workers) or are Independent (Autonomous or State Universities). Their activities at bargaining better working conditions (better wages, positions and reduction of hours) cause interruptions in the academic life of these institutions. Unions use strikes and suspension of work as a way of pressuring to achieve their goals which is reflected in the student academic performance. Most of the tertiary education institutions also have affiliated upper secondary schools. Out of 36 institutions, there are 31 affiliated to ANUIES and are subject to having student conflicts at the upper secondary. This linkage affects academic life at the tertiary level since it can cause a strike as a way of pressuring to obtain their aims (the problem at the UNAM for increasing fees is an example).
- Finally, the results found, which have been described through out the two previous chapters as well as this one, provide theoretical support to the objectives in the WBG’s assistance strategy (CAS). These objectives are: i) Development of basic education, and increased access to these programs for the poor, which will continue to be the central element of the WBG’s sector strategy for the next three years. The objective is to achieve major improvements in equity, service quality, and institutional capacity for efficient delivery. Special attention will be given to assisting the states, under their newly decentralized educational responsibilities. ii) Support to secondary education will focus on increased educational attainment, to gradually bring Mexico to the level of other OECD countries. iii) In higher education, the WBG will continue to implement a market-based program of student loans to improve access to higher education, particularly for academically qualified but financially needy students, and to develop more effective, financially viable student loan institutions. iv) Finally, the WBG assistance will seek to improve worker’s opportunities in the labor market, primarily through the development of a more demand-driven, financially sustainable vocational training system with stronger links to industry and increased private sector participation, within the framework of a national system of labor competency norms and certification.

ANNEX 1. DATA SOURCES

The National Household Income and Expenditure Survey (ENIGH) and the National Urban Employment Survey (ENEU) were used in this study.

1.1 ENIGH

The National Household Income and Expenditures Survey is collected by the Instituto Nacional de Estadística, Geografía e Informática (INEGI). This survey is available for 1984, 1989, 1992, 1994 and 1996⁶⁴. Each survey is representative at the national level, urban area and rural area. For 1996, the ENIGH is also representative for the states of Mexico, Campeche, Coahuila, Guanajuato, Hidalgo, Jalisco, Oaxaca and Tabasco.

For each year the survey design was stratified, multistage and clustered. The final sampling unit is the household and all the members within the household were interviewed. In each stage, the selection probability was proportional to the size of the sampling unit. Then, it is necessary to use the weights⁶⁵ in order to get suitable estimators.

The table below shows the sample size for each year.

Table 1. Sample Size by Year

Year	Number of households	Number of persons
1984	4,735	23,756
1989	11,531	56,727
1992	10,530	50,378
1994	12,815	59,835
1996	14,042	64,359

The available information can be grouped into three categories:

- Income and consumption: the survey has monetary, no monetary and financial items.
- Individual characteristics: social and demographic, i.e., age, schooling attendance, level of schooling, position at work, sector, etc.
- Household characteristics.

Category Selection

For the purpose of the analysis, the individuals in the sample were classified according to their educational level, position in occupation, sector of activity and geographical region in the following categories:

⁶⁴ The sample in a given year is independent from another.

⁶⁵ The weights should be calculated according to the survey design and corresponds to the inverse of the probability inclusion.

- a) *Educational level*
- i) Primary incomplete: no education and primary incomplete (one to five years of primary)
 - ii) Primary complete: primary complete and secondary incomplete (one or two years)
 - iii) Secondary complete: secondary complete and preparatory incomplete (one or two years)
 - iv) Preparatory complete: preparatory complete and university incomplete
 - v) University complete: university complete (with degree) and postgraduate studies
- b) *Position in occupation*
- i) Worker or employee
 - ii) Employer
 - iii) Self employed
- c) *Sector of activity*
- i) Agriculture
 - ii) Manufacturing
 - iii) Construction
 - iv) Commerce
 - v) Services
 - vi) Other (utilities, extraction, transports, financial services, communications, etc)
- d) *Geographical regions*
- i) North: Baja California, Baja California Sur, Coahuila, Chihuahua, Durango, Nuevo Leon, Sinaloa, Sonora, Tamaulipas and Zacatecas
 - ii) Center: Aguascalientes, Colima, Guanajuato, Hidalgo, Jalisco, Mexico, Michoacan, Morelos, Nayarit, Puebla, Queretaro, San Luis Potosi and Tlaxcala
 - iii) South: Campeche, Chiapas, Guerrero, Oaxaca, Quintana Roo, Tabasco, Veracruz and Yucatan
 - iv) Distrito Federal.

Group Selection

The labor force was limited to individuals who are:

- i) working as employee, employer or self employer⁶⁶;
- ii) between 12 and 65 years old;
- iii) living in urban areas;
- iv) working 20 hours or more per week;
- v) with positive income;
- vi) having the attributes of interest defined.

The number of persons in the survey that belong to the labor force is shown in the next table.

Table 2. Sample size for the labor force

Year	Number of persons	% of the total sample
1984	3,892	16.4
1989	10,401	18.3
1992	8,752	17.4
1994	10,982	18.4
1996	12,996	20.2

⁶⁶ The respective categories: workers without payment and cooperative's member were excluded because of the sample size.

According to the groups mentioned before, the number of cases is presented next.

Table 3. Sample size by variable and year

Variable	1984	1989	1992	1994	1996
Education Level					
Primary Incomplete	1,246	1,951	1,879	2,387	2,736
Primary Complete	1,299	3,006	2,501	2,975	3,411
Secondary Complete	803	2,875	2,489	3,014	3,734
Preparatory Complete	389	1,614	1,168	1,617	1,915
University Complete	245	955	715	989	1,200
Position in Occupation					
Employee	3,175	8,604	7,188	8,843	10,207
Employer	126	311	393	450	610
Self employed	681	1,486	1,171	1,689	2,179
Total	3,982	10,401	8,752	10,982	12,996

1.2. ENEU

The National Urban Employment Survey is also a micro-level data set collected by INEGI and contains quarterly wage and employment data on the last ten years (1987-1997). Currently, the data is representative of the 41 largest urban areas in Mexico, covering 61% of the urban population following the 2500 inhabitants or more criteria and 92% of the population who live in metropolitan areas with 100,000 or more inhabitants. In 1985, the ENEU included 16 urban areas: Mexico City, Guadalajara, Monterrey, Puebla, Leon, San Luis Potosi, Tampico, Torreon, Chihuahua, Orizaba, Veracruz, Merida, Ciudad Juarez, Tijuana, Nuevo Laredo and Matamoros, covering 60% of urban population in that year. In 1992, 18 more urban areas were included in the survey: Aguascalientes, Acapulco, Campeche, Coatzacoalcos, Cuernavaca, Culiacan, Durango, Hermosillo, Morelia, Oaxaca, Saltillo, Tepic, Toluca, Tuxtla Gutierrez, Villahermosa, Zacatecas, Colima and Manzanillo. In 1993 and 1994, Monclova, Queretaro, Celaya, Irapuato and Tlaxcala entered to ENEU. Finally, Cancun and La Paz joined the survey in 1996. As can be seen in the previous description, the ENEU have always covered about 60% of the national urban population. Therefore, the results deduced from this survey allow one to know and assess the socioeconomic and employment characteristics of the national urban areas.

The data is from household surveys, which fully describe family composition, human-capital acquisition, and experience in the labor market (the variables contain information about social household characteristics, activity condition, position in occupation, unemployment, main occupation, hours worked, earnings, benefits, secondary occupation, and searching for another job). As the ENIGH, the sampling design was stratified, in several stages (where the final selection unit was the household), and with proportional probability to size⁶⁷. So this statistical construction allows us to do comparisons among different years. Moreover, this survey is structured to generate a panel data set which has the characteristic to conform to a rotator panel (a

⁶⁷ For this it was necessary to use weights or expansion factors.

fifth of the total sample goes out and a new one comes in every quarter). Hence, the panel data follows the same household through out the five quarters.

Category Selection

The individuals in the sample were classified according to their educational level, age, sector of activity, position in occupation, hours worked and geographical region in the following categories:

a) Educational level

- i) Primary incomplete: no education and primary incomplete (one to five years of primary)
- ii) Primary complete: primary complete and secondary incomplete (one or two years)
- iii) Secondary complete: secondary complete and preparatory incomplete (one or two years)
- iv) Preparatory complete: preparatory complete and university incomplete
- v) University complete: university complete (with degree) and postgraduate studies

b) Age

- i) 12 to 25 years old
- ii) 26 to 34 years old
- iii) 35 to 49 years old
- iv) 50 to 65 years old

c) Sector of activity

- i) Primary sector
- ii) Manufacturing industry
- iii) Not manufacturing industry (construction, utilities)
- iv) Commerce
- v) Finance services and rent
- vi) Transportation and communication
- vii) Social services (Tourism, education, health, public administration, embassy)
- viii) Other services

d) Status

- i) Employer
- ii) Self employed
- iii) Informal salaried: people that work in an enterprise with 15 workers or less and no receive social security (IMSS, ISSTE, private, etc.)
- iv) Formal salaried: people that works in an enterprise with 16 workers or more or receive social security (IMSS, ISSTE, private, etc.)
- v) Contract

e) Hours worked

- i) 20 to 39 hours per week
- ii) 40 to 48 hours per week
- iii) At least 49 hours per week

f) Geographic regions

- i) North:, Baja California, Baja California Sur, Coahuila, Chihuahua, Durango, Nuevo Leon, Sinaloa, Sonora, Tamaulipas and Zacatecas

- ii) Center: Aguascalientes, Colima, Guanajuato, Hidalgo, Jalisco, Mexico, Michoacan, Morelos, Nayarit, Puebla, Queretaro, San Luis Potosi and Tlaxcala
- iii) South: Campeche, Chiapas, Guerrero, Oaxaca, Quintana Roo, Tabasco, Veracruz and Yucatan
- iv) Distrito Federal.

Group Selection

Analogous to the ENIGH, the universe of study are those individuals,

- i) between 16 and 65 years old;
- ii) living in urban areas (localities with at least 2,500 inhabitants);
- iii) regular workers (non-seasonal workers);
- iv) working 20 hours or more per week;
- v) with positive earnings⁶⁸;
- vi) having the attributes of interest defined.

The table below shows the sample size and labor force.

Table 4. Sample Size by Year

Year	Number of persons	
	Total	Labor force
1988	124,322	45,870
1989	125,820	47,630
1990	127,387	48,109
1991	126,262	48,080
1992	235,696	91,279
1993	239,394	90,860
1994	246,906	102,105
1995	252,563	100,838
1996	262,478	108,159
1997	272,356	116,559

⁶⁸ In this survey an additional adjustment had to be made: if worker got a Christmas or New Year gift ("aguinaldo"), then the wage was expanded (we assumed that this benefit as equivalent to 30 days of wage a year).

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**Minutes of Meeting with Government Officials to Discuss the “Earnings Inequality
after Mexico’s Economic and Educational Reforms” Report
Tuesday, March 28th, 2000**

A meeting to discuss the above-referenced green cover World Bank Report with Mexican Government officials was held in Mexico City on Tuesday, March 28, 2000. The meeting was chaired by Mr. Carlos Mancera Corcuera (Underminister of Planning, Ministry of Education). The Bank’s delegation was led by Mr. Marcelo Giugale (Lead Economist). A list of the participants is attached.

Format of meeting. Mr. Carlos Mancera called the meeting to order and proposed the agenda for the discussions, also attached. Mr. Marcelo Giugale followed with a brief introductory statement on the importance of education and sector work in the Bank’s assistance program, and the task manager presented the results of the document. The remainder of the meeting took place in a seminar format, with some parts of the report discussed individually, beginning with some introductory comments by Mr. Eduardo Velez (HD sector leader). The presentation on each one of the chapters that comprises the study was followed by a general round-table discussion and reply from the task manager of the report.

The report was very well received by the participants of the meeting, giving rise to an animated and well-focused discussion. The main points raised by government officials are summarized below (grouped by chapter), together with the responses offered.

Comments on Chapter 1.- (For reference, Chapter 1 presents the factors and mechanisms driving earnings inequality; the evolution of education attainment; the evolution and structure of the rate of returns to education). One of the participants indicated that the increase in the rates of returns to education at the bottom of the conditional earnings distribution suggests that education is a good mechanism to redistribute income. Other commentator elaborated on certain aspects of the education sector, including recent progress made in improving education quality, targeting education spending on the poor, Progresá and the role of compensatory programs on school attendance. The discussants made clear that if the information could be updated to 1999, Mexico will clearly lie above the trend line in the cross-country relationship between the levels of economic development and education attainment of the labor force. Some participants felt that the relative decline of rates of return for primary education in the recent past is largely due to poorer job prospects for students with lower education attainment levels. Even so, the production of graduates with higher education levels will still require that they complete primary education first, which limits the flexibility in shifting resources from the primary to higher education levels. Another commentator noted that the evolution of rates of return in education is also likely to reflect problems on the supply side of the education sector. Other participants mentioned that the document explains clearly the mechanisms driving the increase in the rates of returns to education in the upper tail of the income distribution. In general, it was agreed that technical education only after completing basic education is important for reducing earnings inequality. Technical education could be an alternative for those individuals that face both a high opportunity cost to continue formal education and need to acquire skills that enable them to participate in the job market. It was also argued by one commentator that a better focalization of public expenditures on technical education is needed as well as an assessment of the unit cost of provision of technical educational services. A participant mentioned that the change of the structure in the share of the labor market for lower secondary and upper secondary educational level and the pattern of the earnings differentials among the different educational levels (technical and formal level) could possibly be the result of a combination of several factors: (i) during the 90’s there was a high demand for skilled workers in Mexico; (ii) during the 80’s there was a substantial increase in basic education coverage; and (iii) the youngsters are facing several restrictions on continuing education after completing upper secondary instruction. Another commentator

indicated that conditional real earnings dramatically fell after 1994. As explained, additional work is needed to assess to what degree the move in the level and distribution of wages could be explained entirely by labor supply shocks without recourse to trade related issues.

Comments on Chapter 2.- (This chapter analyzes the patterns of public and private educational expenditures; the determinants of enrollment in upper secondary and university levels and the marginal willingness to pay for educational services). One commentator indicated that the results from the incidence analysis and the determinants of enrollment support the role of the compensatory programs. Various discussants expressed uneasiness about the marginal willingness to pay approach. It was explained that the difference between the marginal willingness to pay for public educational services and the marginal willingness to pay for private services measures the effect of the government provision of public schools on the education spending behavior of an average household. This difference reflects the relative quality and payments (fees and unforeseen expenses) associated with public and private schools. One commentator expressed that the difference between the marginal willingness to pay for pre-primary versus primary educational level reflects higher fees in the first level. Another discussant suggested to do the marginal willingness to pay analysis by state and family size. In addition, it was suggested to indicate in the document which poverty line was used to compute the marginal willingness to pay for educational services. Also, questions were raised about the government's current emphasis on subsidizing education on the supply side, and it was recommended that consideration be given to shifting subsidies increasingly to the demand side or find a balance between the two. In this context, one participant also noted that supply-side subsidies may influence locational decisions by beneficiaries, encouraging greater population dispersion, which feeds back into raising the unit costs of subsidization. Several participants took the opportunity of this meeting to raise questions about the SEP's approach to measuring education quality.

Comments on Chapter 3.- (This chapter examines institutional factors that limit the production of graduates). It was recognized that the study does not show how the curricula diversity affect student's performance. In addition, the study does not assess the optimal number of specialties. One participant mentioned that the diversity in the curricula in higher education is good because generates a flow and creates a link with basic education. Moreover, it helps the students to acquire skills and adapt to different labor market conditions. A commentator indicated that the results from the rates of returns and the incidence analysis show that better targeting of public educational resources in higher education is needed. It was suggested that more resources should be devoted to vocational education and training.

In his concluding statements, the Chairman thanked all participants and indicated that the meeting had provided a great opportunity for a fruitful exchange of ideas. He also indicated that it will be important to moderate the tone of some of the paragraphs in the document. In addition, he suggested to narrow down and qualified the conclusions derived from the analysis of the private rates of return to higher education, the benefit incidence analysis in higher education and the calculations of marginal willingness to pay for basic educational services.

**Earnings Inequality after Mexico's Economic and Educational Reforms – Meeting with
Mexican Government
Brasil 31, piso 2, Sala de Juntas
March 28th, 2000
18:00 - 20:15**

Government staff participating in the meeting:

Secretaría de Educación Pública (SEP)

Lic. Carlos Mancera Corcuera (Subsecretario de Planeación y Coordinación, SEP)
Lic. Arturo Villalobos (Director General de Educación, SEP)
Lic. Rafael Miramontes Lomelí (Subsecretaría de Educación Superior e Investigación Científica, SEP)
Lic. Antonio Sauri Lomelí (Subsecretaría de Educación Superior e Investigación Científica, SEP)
Lic. Cesar Ortíz (Asesor del Subsecretario de Planeación y Coordinación, SEP)
Lic. Fernando Córdoba (Asesor del Subsecretario de Planeación y Coordinación, SEP)
Lic. Mario Alberto Oliva (Asesor, SEP)
Lic. Jorge Enrique Juárez Barba (Economista, Unidad Desarrollo Educativo, Aguascalientes, SEP)
Lic. David Díaz Romo (Economista, Unidad de Desarrollo Educativo, Aguascalientes, SEP)
Lic. Rodolfo Navarro Ochoa (Director de Planeación Educativa, Estado de Colima, SEP)
Lic. Eugenio Flores Villasuso (Director de Planeación Educativa, Estado de San Luis Potosí, SEP)
Lic. Serafin Aguado Gutiérrez (Consejo del Sistema Nacional de Educación Tecnológica, SEP)
Lic. Guillermo Betancourt (Dirección General de Programación Planeación y Presupuesto, SEP)
Lic. Diego Gaspar (Secretaría de Planeación y Coordinación, SEP)

Secretaría de Trabajo y Previsión Social (STPS)

Lic. Alfredo Narvaez (Coordinador General de Políticas, Estudios y Estadísticas del Trabajo, STPS)
Lic. Rodolfo Mendoza Cedillo (Coordinador General de Normatividad, STPS)
Lic. Oscar Margain Pitman (Director General de Empleo, STPS)
Lic. Sergio Sierra Romero (Director de Normatividad, STPS)
Lic. Sandra Barajas Beltrán (Directora de Información Ocupacional, STPS)

Secretaría de Hacienda y Crédito Público (SHCP)

Lic. Evelyn Rodríguez (Directora General Programación y Presupuesto Agropecuario, SHCP)
Lic. Debora Schlam (Directora General Adjunta de Análisis y Educación Sectorial)
Lic. Ignacio Chávez (Coordinador de Programas Especiales, SHCP)
Lic. Miguel Angel González (Director de Proyectos Especiales, SHCP)
Lic. Ana Laura Terrazas (Jefe de Departamento Programas Sociales, SHCP)
Lic. Paola Perezniето (Jefe de Departamento de Proyectos Sociales, SHCP)
Lic. Miriam Matamoros (Asesor del Subsecretario de Egresos, SHCP)

Instituto Nacional de Estadística, Geografía e Informática (INEGI)

Lic. Antonio Nieblas (Subdirector de Estadística, INEGI)
Lic. Ernesto Tapia Cupil (Economista, INEGI)

Programa de Alimentación, Salud y Educación (Progresa)

Dra. Susan Parker (Asesora del Coordinador de Progresa)

Bank Staff participating in the meeting:

Mr. Marcelo Giugale (Encomista en Jefe, PREM)
Mr. Eduardo Vélez (Gerente del Sector Social, HD)
Ms. Anna Sant'Anna (Especialista en Sectores Sociales)

Ms. Gladys López-Acevedo (Economista, PREM)
Mr. Angel Salinas (Consultor, PREM)
Ms. Mariana Urbiola (Consultor, PREM)
Ms. Mónica Tinajero (Estadística, U.N.A.M)

**Seminario Banco Mundial
Marzo 28, 2000**

ORDEN DEL DIA

- 18:00 **Presentación**
 Carlos Mancera Corcuera (SEP)
- Introducción**
 Marcelo Giugale (Banco Mundial)
- Presentación general del documento**
 Gladys López-Acevedo (Banco Mundial)
- 18:45 **Discusión**
- Factores institucionales que afectan la educación media y superior**
 Tasas de retorno a la educación
- Valuación por los servicios educativos**
- Calidad de los servicios educativos**
- Desigualdad y Educación**
- Educación Técnica**

**Minutes of Meeting with Government Officials to Discuss the “Earnings Inequality after Mexico’s Economic and Educational Reforms” Report
Monday, April 10th, 2000**

A second meeting to discuss the above-referenced green cover revised World Bank Report with Mexican Government officials was held in Mexico City on Monday, April 10th, 2000. The meeting was chaired by Lic. Cesar Ortiz (Advisor to the Underminister of Planning, Ministry of Education). Gladys Lopez -Acevedo attended the meeting on the part of the Bank. A list of the participants is attached.

Objective of the meeting. Mr. Cesar Ortiz called the meeting to discuss the revised version of the document. In addition, each government official representing the Ministries of Education, Labor and Hacienda verified that the comments received on March 28th had been incorporated in the document. It was agreed that if there are no further comments after May 28th, formal authorization will be given on the part of Hacienda for the report to go into gray cover.

**Earnings Inequality after Mexico’s Economic and Educational Reforms –
Meeting with
Mexican Government
Brasil 31, piso 2, Sala de Juntas
April 10th, 2000
10:00 - 13:00**

Government staff participating in the meeting:

Secretaría de Educación Pública (SEP)

Lic. Cesar Ortíz (Asesor del Subsecretario de Planeación y Coordinación, SEP)

Secretaría de Trabajo y Previsión Social (STPS)

Lic. Rodolfo Mendoza Cedillo (Sub coordinador de análisis y política laboral, STPS)

Lic. Sandra Barajas Beltrán (Directora de Información Ocupacional- DGE, STPS)

Lic. Amparo Muñoz (Subdirectora de Información Ocupacional- DGE, STPS)

Secretaría de Hacienda y Crédito Público (SHCP)

Lic. Debora Schlam (Directora General Adjunta de Análisis y Educación Sectorial)

Lic. Ana Laura Terrazas (Jefe de Departamento Programas Sociales, SHCP)

Lic. Socorro Elizalde (Directora de Análisis y Educación Sectorial, SHCP)

Bank Staff participating in the meeting:

Ms. Gladys López-Acevedo (Economista, PREM)