

**Turnover and Job Training in Developing and Developed Countries:
Evidence from Colombia and the United States**

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Abstract

Labor productivity and GNP per capita are lower in developing countries than in developed countries, even after controlling for differences across countries in physical capital per worker and levels of formal schooling. Anecdotal evidence suggests that greater difficulties in training and retaining workers in developing countries may contribute to this “productivity gap.” This paper employs large, high quality household surveys from Colombia and the United States to shed light on several potential explanations (related to job training) for this productivity gap. The first, somewhat surprising observation is that the incidence of post-school, formal job training acquired in relation to the current main job is *higher* among male private sector wage employees in Colombia than among their counterparts with similar levels of schooling in the U.S. The typical intensity of training also appears at least as great in Colombia as in the U.S. This casts doubt on explanations for the productivity gap in which labor productivity is lower in developing countries because (for reasons discussed in the paper) the typical worker simply has less job training. It also establishes that job training is important in developing country production. The second main observation is that while private sector wage employees in Colombia accumulate training at a higher rate over the course of their careers than their counterparts in the U.S., their wages tend to rise much more slowly as they age. After considering alternative explanations, the paper interprets this to mean that higher job turnover rates in Colombia cause the value of job training investments to be eroded more rapidly in Colombia than in the U.S. This constitutes new evidence that job training is “specific”, in the sense that it tends to lose value when workers change jobs. It implies that higher pressures for job turnover in Colombia and other developing countries increase the cost of keeping trained positions filled. Because the increased costs take the form of more labor hours (of trainees and trainers) diverted away from directly productive activities and into training activities, they represent reductions in average labor productivity. Thus further research into job turnover and training problems in developing countries may uncover means to reduce the productivity gap and to improve living standards in developing countries.

I. Introduction

Recent research has increased awareness of two differences between labor market outcomes in developing and developed countries. First, job turnover rates are often much higher, and the share of jobs that are long-lasting much lower, in developing countries relative to developed countries (see, e.g., Calderon-Madrid, 2000; Kim and Topel, 1995; and Schaffner, forthcoming). Second, labor productivity is lower in developing countries than in developed countries, even after controlling for differences across countries in levels of physical capital per worker and levels of formal education. In fact, this productivity gap is more important than differences in the stocks of formal education and physical capital in explaining overall differences in output per worker between developing and developed countries (Hall and Jones, 1996).¹

A large theoretical literature on long-term employment contracting suggests that these two observations may be linked. Employers might use long-term employment contracts (involving efficiency wages or upward-sloping wage-tenure profiles) to provide workers with incentives to work hard or to help employers economize on training or screening costs by remaining in the firm (see, e.g. Becker, 1962; Hashimoto, 1981; Stiglitz, 1974, Bulow and Summers, 1986; Lazear, 1981). Differences in economic environment or policy that increase the cost, and reduce the use, of long-lasting employment contracts might increase the cost of engaging in productivity-enhancing labor practices, thereby lowering productivity. (Examples of the economic circumstances that tend to increase the cost of long-lasting employment contracts are discussed briefly

¹ Case studies such as Morawetz (1981) and Pack (1987) indicate furthermore than cross-country productivity differences are evidence even when comparing firms producing the same goods with the same machines and using workers with similar formal qualifications.

in Part II below, and somewhat more in Schaffner, forthcoming). But empirical evidence of a link between high turnover pressures and low productivity is thus far lacking.

This paper begins empirical examination of the link between turnover pressures and productivity by examining the link between turnover and an observable practice thought to be important for productivity: job training. Job training outcomes are linked to productivity in two ways. Most obviously, a higher incidence of job training increases average productivity among workers in their directly productive activities. The higher productivity observed in firms that report providing training (e.g. Tan and Batra, 1995; Aw and Tan, 1994) is thought to reflect this, though the possibility that both productivity and training choices are driven by unobserved third factors cannot be ruled out entirely. Perhaps less obviously, higher costs of keeping trained positions filled may themselves reduce labor productivity, even when they do not reduce the incidence of training, by necessitating the diversion of more trainer and trainee time away from direct production activities into training activities. Thus it would be useful to know the answers to two questions. First, is the incidence of job training lower in developing countries than in developed countries? Second, do the higher rates of job turnover often observed in developing countries imply higher costs of keeping trained positions filled? This paper examines large household survey data sets from Colombia and the United States, seeking to shed light on the answers to these two questions.

Colombia and the United States are useful countries with which to begin the investigation of these questions. As discussed in Part II below, Colombia differs from the United States in many ways that are typical of developing-developed country comparisons, and that might be thought to render the developing country environment

more hostile to job training. If these environmental factors create problems for training in many developing countries, they should be apparent in the Colombian case. This makes the finding of Part III below – that for workers with similar schooling the incidence of job training is *higher* in Colombia than in the United States -- especially striking.² The combination of higher training incidence and higher turnover rates, in Colombia relative to the United States, also renders the pair of countries useful for examining whether turnover erodes the value of past training investments, as discussed below.

The paper proceeds as follows. Part II describes the household surveys employed and presents descriptive statistics and background information about Colombia and the United States that puts the training study into perspective. Part III discusses the methodology for, results of, and interpretation of careful comparisons of the incidence of post-school formal job training acquired in relation to the current main job in Colombia and the United States. The robust result is that among workers with similar levels of schooling, or in similar production activities, workers in Colombia are more likely to have received training on the current job than workers in the United States. Analysis of cross section wage regressions suggests furthermore that the typical intensity of training is at least as high in Colombia as it is in the United States.

Part IV proceeds to the question of whether higher turnover rates appear to increase the cost of keeping training positions filled in Colombia. Because the theory of

² In order to focus on high job turnover and other feature of economic relations in developing countries, it would be useful to compare countries that differ in job turnover rates but share the same training policies and the same involvement of worker, employer and community groups in training activities. While these training institutions (discussed below) are not identical in Colombia and the United States, the countries both fall on the “market-driven” end of the training institutions spectrum.

general job training makes clear that training investments need not be affected by turnover rates, it begins by discussing reasons why the value of training may indeed be diminished or lost when workers change jobs, and thus why higher turnover might increase the cost of keeping trained positions filled. It then presents evidence on differences between Colombia and the United States in two career patterns: workers accumulate training experiences at a more rapid rate throughout their careers in Colombia than in the United States, but their wages tend to rise more slowly as they age. If the value of job training investments is not reduced when workers change jobs, then wages should rise more rapidly as people age in an environment where workers accumulate training experiences at a higher rate. The most compelling explanation for the low effect of experience on age in Colombia is that higher rates of movements across employers reduces the value of the training they acquire. Alternative interpretations of the empirical patterns are also discussed. Part V concludes with suggestions for future research.

II. Data and Descriptive Background

The Data. The data for Colombia are derived from the Encuesta Nacional de Hogares (ENH) of June 1994, while the data for the United States are from the Current Population Survey (CPS) of January 1991. The Colombian ENH is a survey of approximately 20,000 households representative of 10 metropolitan areas, the smallest of which had a population of approximately 228,000 in 1992. The CPS is administered to a nationally representative sample of approximately 50,000 (though some of the supplementary question required for this study were administered to only one quarter of those households). For comparability with the Colombian sample, I restrict attention to

households in Metropolitan Statistical Areas with populations of at least 100,000. The years 1994 and 1991 were chosen because of the inclusion of supplemental questions related to job training in the two surveys. The U.S. economy had been growing for several years by 1991, though employment had been growing less rapidly than in other expansions. The Colombian economy had been growing for several years in 1994, but the period was made somewhat unusual by a series of reforms in trade policy and labor legislation in 1991 and 1992.

The descriptive statistics in Table 1 place the training comparisons below into context. While most statistics in the table are derived from the two surveys just described, the information on employer size for the U.S. is taken from the CPS of May 1997. Descriptive statistics are calculated using population weights provided by the ENH and the CPS. In addition to describing cross country differences in the occupational (white collar versus blue collar) and industrial structure of employment, Table 1 demonstrates that Colombia differs from the United States in a number of ways that developing countries often differ from developed countries. Three of these differences might render the cost of job training higher in developing countries: higher job turnover, lower stocks of human capital produced by formal schooling, and smaller typical scale of production. The following paragraphs discuss these differences in more detail.

Turnover Differences. Table 1 reports only the simple means and standard deviations of workers' reports regarding how many years they have been on the current job. Schaffner (forthcoming) undertakes a more detailed comparison of job tenure distributions for Colombia and the United States. That paper examines both cross section distributions of workers' reports of current job tenure, and estimated job retention

probabilities derived by following synthetic cohorts of workers over time in repeated cross sections. The paper finds that jobs are significantly shorter in Colombia than in the United States, largely because workers in their first year of tenure on the job are much less likely to retain their jobs in Colombia than in the United States. Once workers have been on the job for a few years, their probabilities of retaining those jobs are at least as high in Colombia as in the United States. Thus there appears to be more use of very short-term labor in Colombia. The evidence presented in Schaffner (forthcoming) also suggests that the lower incidence of long-lasting jobs is not merely the result of counter-productive job security legislation in Colombia, nor the result of Colombia's greater specialization in production activities in which long-term employment contracts are less important. It suggests that the cost of long-term employment contracting is higher in Colombia than in the United States, and probably in developing relative to developed countries more generally.

The costs of long-term employment contracting may be higher in developing countries relative to developed countries for several sets of reasons, which are discussed in Schaffner (forthcoming). Untrustworthy transportation and communication infrastructure, unstable policy, and high dependence on fluctuating world commodity markets, as well as poor public health and health care systems, may all increase the probability that jobs come to an end for reasons unrelated to contract performance. Increases in such "exogenous job separation rates" increase the effective rate at which workers discount the promise of high wages in the future, and thus increase the cost of long-term employment contracts that are effective at increasing productivity. The relative cost of long-term employment contracts may also be higher as the result of more

severe credit constraints on workers or employers, or higher direct costs of the productivity-enhancing practices (such as job training) that are facilitated by long-term contracts. Finally, models of multiple equilibria in labor market outcomes (such as Chang and Wang, 1995), suggest reasons why the relative cost of long-term employment contracting may be higher in some countries than in others even when the fundamentals are the same. Section IV below discusses the circumstances under which the economic factors underlying high turnover rates also increase the relative cost of job training.

Other Reasons Why Training Costs May Tend to Be Higher in Developing Countries. A second observation from Table 1 is that the average worker in Colombia has less formal schooling than his counterpart in the United States. While in urban areas of Colombia and the United States most workers have at least some primary education, Colombian workers are much less likely to have completed secondary education. The quality of public schooling furthermore seems to be much lower in Colombia than in the United States (Wolff, et al.). The cost of imparting skills to workers through job training is thought to be higher for workers with less, or lower quality, formal education. The frequent empirical finding of positive cross-section correlation between level of formal schooling and the probability of receiving job training is interpreted as evidence of this schooling-training complementarity (Frazis, et al; Arriagada, 1989).

As is true in developing countries more generally (Tybout, 2000), the typical private sector wage employee is employed in a much smaller establishment in Colombia than in the United States. The smaller scale of production is thought to increase the cost of job training, by reducing the number of workers across which the fixed costs of setting up a training program can be spread. The positive cross-section correlation typically

found between establishment size and training probabilities is interpreted as evidence of these scale economies (Frazis, et al, 2000; Lynch and Black, 1995).

Differences in Training Policies and Institutions. In both Colombia and the United States, training outcomes are largely market-driven. Though Colombia uses a 2 percent payroll tax (collected only within the limited covered sector) to finance a government run training program (SENA), the tax is not conditioned on training investments, and most job training is done without direct involvement of the government. SENA provides a few 3-year apprenticeships, which appear to produce significant private returns (Jimenez, et al., 1989), but most SENA students attend 3-month evening classes. The programs are widely believed to be of low quality, and, in a survey of 500 Colombian employers collected by the World Bank, employers report much more use of costly private training than of the highly subsidized SENA training (Tan and Batra, 1995). Colombian policies and institutions do not appear much more encouraging of job training than U.S. policies and institutions. Thus if higher turnover, weaker schooling stocks and smaller scale of production tend to reduce training in developing countries relative to developed countries, the problem should be apparent in the Colombia-U.S. comparison.

III. Training Incidence Comparisons

A. Methodology

Meaningful comparison of job training incidence across countries using household survey data requires close attention to three methodological concerns: construction of comparable job training incidence measures, the use of weights allowing estimation of population characteristics from sample statistics, and conditioning.

Construction of Comparable Job Training Incidence Measures. Appendix Table A.1 presents the training question sequences from both surveys. The main training question in the Colombian survey is “Has...received training courses for his main job?”, which is asked only of respondents who answer affirmatively the preceding question: “In addition to formal schooling, has ... received training courses for work?” The main training question in the U.S. survey is “Since you obtained your present job did you take any training to improve your skills?” These questions differ in three respects: the formality of the training, the inclusion or exclusion of training acquired through formal schooling, and the relationship of the training to the current main job. Fortunately, the main U.S. training question is more inclusive along all three dimensions than the main Colombian question, and additional questions in the U.S. survey allow the construction of a training incidence measure that is comparable in all three dimensions. Loewenstein and Spletzer (1994) document that differences in training question phrasing and sample design lead to large differences in measured training incidence rates across the main U.S. datasets. They also demonstrate the heartening result that careful use of subsidiary questions to refine training measures, and careful attention to constructing comparable samples, allow one to derive very similar rates of formal job training from the differing U.S. surveys.

Consider first the degree of formality of the training. It is well known that much training is likely to be informal. Not taking the form of “courses,” such activities are not likely to be included in responses to the Colombian training question. The CPS question, too, is thought to exclude much informal training (Loewenstein and Spletzer, 1994), but may exclude less informal training than the Colombian question, because it refers to “training” rather than “training courses.” Fortunately, a follow up question in the CPS allows exclusion from the training incidence measure of individuals whose only training was reported to be “informal.”

Consider next the treatment of school-based training. The initial Colombian question explicitly asks about training “other than formal education”. The U.S. training question does not make this exclusion. Again, however, follow up questions allow identification of those whose training was received in school, and then further differentiation into types of schools. For the main training measure employed below, individuals whose training was acquired in school are included only if they report the schooling to be either a post-high school vocational school program or a program in a junior or community college or technical institute. Individuals receiving training only in a high school vocational program or a 4-year or longer college program are excluded from the training incidence measure.

Finally, consider the relationship to the current main job. The Colombian question focuses on training *received for*, or in relation to, the current main job. The U.S. question focuses on training *taken since you obtained your present job*. In both cases the training is related to the current main job, but in the Colombian case it is related functionally, while in the U.S. case it is related temporally. The notions of training may

differ in two ways. First, the Colombian measure may include some training that was taken before the start of the current main job in order to obtain the current main job, though the lack of explicit reference to such training makes it unlikely that much such training is included. The CPS includes explicit questions about such training. If information from those questions, which probably greatly overstates the difference in main training questions for the two countries, is used to add to the U.S. measure formal job training required to obtain the current job, U.S. training incidence measures rise by about one third, but do not reverse the qualitative results in the conditioned incidence comparisons presented below.

The second potential difference between the relationship to the current main job implied by the main Colombian and U.S. training questions is that the Colombian measure may exclude training taken during the current main job for the purpose of obtaining a different job. Such training may be included in responses to the CPS question, though the inclusion of the phrase “to improve your skills” and the explicit reference to the current job limit the inclusion of such training. On the assumption that the individuals whose training is most likely to be taken for obtaining a new job rather than improving performance on the current job are those who are paying for the training themselves, I tried eliminating from the U.S. incidence measure individuals whose only training was in a post-secondary vocational institute or community college or technical school, and who report that their employers did not pay for any of that training. This makes little difference for the incidence comparisons below.

In addition to the main training questions, both surveys contain follow-up questions regarding the type of training. Appendix Table A.2 gives details on how this

information can be used to construct measures of “company”, “institute” and “government” training. Government training refers to training in SENA institutes in Colombia, and training through the JTPA program in the United States. In both surveys respondents can indicate as many types as they wish, thus the sum across the three types of training of the percentage of workers reporting such training does not have to equal the aggregate incidence measure.

Weighting. For both surveys, weights (provided by the survey organizations) must be applied when estimating population means, because the samples depart in small ways from perfectly self-weighting samples. It is furthermore useful to adjust the weights provided by the survey organizations for non-response on the training question. I thus divide the weights by the response rates within cells defined by age and education levels. Response rates are 73.7 percent in the U.S. and 99.4 percent in Colombia. Colombian response rates are uniformly high, probably because Colombian interviewers were instructed not to take “don’t know” for an answer. U.S. response rates are somewhat lower, and rise more with education level. In practice, the results using the adjusted weights (reported below) are nearly the same as those employing unadjusted weights or no weights at all.

Sample and Conditioning. Attention in the rest of the paper is restricted to males ages 15 to 59 in private sector, nonagricultural wage employment. It is useful to compare training incidence measures not only for this group as a whole, but also for various subgroups. Interest in a “productivity gap” that remains important even when comparing workers with similar formal qualifications, and who are engaged in similar production

activities, raises interest in results disaggregated by level of formal schooling, as well as by occupation and industry.

B. Basic Incidence Results

Overall Incidence. Table 2 describes the incidence of post-school formal job training obtained in relation to the current main job in Colombia and the United States, for male private sector wage employees aged 15 to 59, and for various subgroups defined by education level and type of production activity (industry and occupation). Appendix A.2 defined the main training incidence measure, as well as some alternative measures that were mentioned in the paragraphs above. The definitions make reference to specific questions in the training question sequences reported in Appendix Table A.1.

Table 2 puts forth the somewhat surprising result that, among all wage employees in the two countries, a very similar percentage have been trained in their current job in the two countries. Once the comparisons are disaggregated, training incidence is noticeably higher in Colombia than in the United States, especially among more educated individuals, and individuals engaged in white collar activities.

Disaggregation by employer size would make the Colombia-U.S. difference larger still. The Colombian data allow disaggregation between employers with more and fewer than 10 employees. While the 1991 CPS does not include an employer size variable, the May 1997 (which unfortunately does not contain training information) indicates that 80 percent of private sector wage employees work for employers with at least 10 employees. Re-weighting Colombian observations from workers in establishments with more and fewer than 10 employees, so that 80 percent of the

hypothetical population represented by the weighted statistics have employers with more than 10 employees, the aggregate Colombian incidence rises from 24.6 to 30.2.

Type of Training. Table 3 disaggregates some of the training comparisons by the type of training. In the aggregate, and in every group presented, a smaller share of trained workers report having received company training in Colombia than in the United States. A larger percentage of trained workers report participating in SENA in Colombia than in the JTPA in the United States, but in most groups total training incidence in Colombia would continue to exceed incidence in the United States, even if government training were excluded.

The greater relative importance of private sector training providers other than the firm itself in Colombia than in the United States is unsurprising given the smaller typical scale of production. Less able to overcome the fixed cost hurdle, the employers of fewer workers would choose to set up in-house training programs, and would thus meet their training needs by purchasing the services of outside providers.

C. Training Intensity

Comparison of measures of training incidence may be misleading, if we want to compare the size of the stock of training across countries, because training “intensity” could differ greatly across countries. For example, higher incidence of training in Colombia could merely reflect a greater frequency of very short, trivial training programs that add little to productivity. Though no direct measures of training intensity are available, cross section log wage regressions including measures of training incidence shed some light on the intensity comparison.

Table 4 presents estimates of training coefficients from a variety of log wage regressions, performed for the samples as a whole, and separately by education level, for Colombia and the United States. All regressions include years of schooling, potential labor market experience and its square. OLS regressions both with and without additional controls for industry and occupation are reported. In addition to the results of OLS, I report the results of two more estimation methods.

Median regressions are reported for several reasons. In general, they should be more robust to the existence of outliers. More specifically, we may be more interested in how training affects median wages than mean wages for two reasons. First, as demonstrated by Bell (1996), the legal minimum wage appears to be binding for a significant fraction of Colombian workers. This may constrain employers' ability to differentiate wages for trained and untrained workers in the lower tail of the wage distribution, thus limiting the usefulness of wage differences across trained and untrained workers for identifying productivity differences. Second, greater skew in the distribution of training intensity may cause large differences in mean wages between trained and untrained workers in Colombia, even when most training episodes are of low intensity and value.

The final set of estimates included in Table 4 make use of methods in the spirit of Heckman (1979) and Lee (1982) to control for the endogenous selection of male employees into private sector wage employment. Following Schaffner (forthcoming b), I have allowed for the nonlinearities implied by heteroscedasticity in the selection rule error by entering the first stage regressors in a flexible fashion. I have also performed some analysis of the sensitivity of the results to changes in sample selection model

specification choices, and to two-stage versus maximum likelihood estimation. The results presented in Table 4 are representative of all the specifications I considered.

The robust conclusion from Table 4 is that training coefficients in log wage regressions are at least as large in Colombia as in the United States. In interpreting this result, it is important to point out that the coefficient on training in a log wage regressions for private sector wage employees contains two components: “true” premiums paid to trained workers because they have been trained, and “spurious” premiums paid to trained workers because they happen to be more able workers (who would have received higher wages even if they had not received training). Two observations indicate that the spurious component is likely to be smaller in Colombia than in the United States. First, private sector wage employees are themselves a more select group among the employed, given the much higher incidence of self employment. This might be expected to reduce the degree of heterogeneity among wage employees. Second, among private sector wage employees, workers with training are a larger fraction of the total in Colombia than in the United States. Thus they are likely to be a less select group within a less heterogeneous population.

Table 5 disaggregates the training incidence measures by type, employing three incidence measures in the OLS log wage regressions in the same samples considered in Table 4. The results here are more difficult to interpret, because the nature of selection biases (across three types of training) is now potentially much more complicated, and because some small samples render estimates imprecise. They do not appear consistent with the potential concern, suggested by some studies of the United States, that private institute training, which is more prevalent in Colombia, is significantly less valuable.

Indeed, the apparent wage effect of private institute training is higher than the effect of company training in Colombia, though the reverse is true in the United States. The smaller typical scale of production may shift the production of some of the most valuable training activities to external institutions in Colombia.

Additional information available in the two surveys reinforce the sense that the training received in neither country is trivial. Unfortunately, none of this information may be compared across countries. Colombian workers who reported receiving training on the current job were asked what that training had permitted in their main job (multiple responses allowed). The responses (response rates) were as follows: rise (35 percent), improve income (42 percent), recognition (20 percent), improve performance (80 percent), nothing (3 percent). U.S. workers who reported receiving training in relation to the current job were asked what kind of training (multiple responses allowed). The responses (response rates) were as follows: reading, writing or math skills (15 percent), computer-related skills (36 percent), other technical skills specific to your occupation (67 percent), managerial or supervisory skills (38 percent), other (23 percent).

C. Interpretation of Incidence Results

In drawing conclusions about differences between Colombia and the United States in the magnitude of investments in “training,” it is important to consider the implications of having to limit attention to a single measure: formal job training acquired in relation to the current main job.

Formality of Training. Comparison of measures of formal job training may be misleading, if we want to compare the incidence of total job training, and if informal training incidence differences favor the United States. It seems likely, however, that the

share of informal training in total training would be higher in Colombia than in the United States, given much smaller scale of production, and the greater degree of informality of the Colombian economy in general. In smaller establishments more training is likely to take the form of working side by side with, and under the direct guidance of, the owner/employer, who also contributes skilled labor in the enterprise. Thus it seems likely that if the incidence of formal training is higher in Colombia, the incidence of total training is higher in Colombia as well.

Tie to Current Job. Comparison of the incidence of job training received on the current job could lead to misleading conclusions about the relative stocks of valuable training investments in the two economies, if some value of training is retained when workers change jobs. Since, however, both the incidence of job training acquired on the current job and the typical number of jobs that workers have had are both higher in Colombia, it seems likely that the total stock of training experiences is higher in Colombia. Section IV below expands on this idea. The focus on job training acquired during the current main job also allows observation of the link between training activities and certain employer characteristics, which would not be possible using household survey data involving workers' reports of whether they had *ever* received training.

Summary. It appears that both the flow and stock of valuable training investments in private sector wage employment are at least as high in Colombia as in the United States. This rules out the simplest training-related story linking higher turnover to lower productivity. If the cost of keeping trained positions filled is indeed higher in Colombia than in the United States, some combination of low substitutability between trained and untrained labor, and higher inherent needs for training in the developing economy, keep

training incidence relatively high. This apparent importance of training in the developing economy renders it especially important to consider the potential effect of higher turnover on training costs.

IV. Accumulation of Training Experience and Wage-Experience Profiles

A. Turnover, the Value of Job Training Investments, and Cross Country Comparison

Do higher rates of job turnover increase the cost of keeping trained positions filled, increasing production costs and possibly weakening incentives toward investment in training? As the theory of general job training (Becker, 1962) makes clear, this need not be the case. If training produces skills of value to many employers, and if workers and employers have free and equal information about the skills workers have acquired and the jobs in which those skills are valued, then workers can expect competition among employers to bid their post-training wages up to the level of their post-training productivity. Expecting to reap the full benefit of training investments, workers would be willing to (and would have to) bear the full costs of training, and would even choose the socially optimal quantity of training investments if they could borrow at an interest rate equal to the social rate of discount. Changes in turnover rates would affect neither workers' incentives to invest in training, nor the price employers would have to pay for the services of trained workers.

For two sets of reasons, however, workers might not expect competition among employers to bid their post-training wages up to the level of their full post-training productivity (as realized in the job for which the skills were acquired). The classical

reason for thinking that the value of training might decline when workers change jobs is the possibility that job training provides workers with skills that are intrinsically “specific” to the employer for whom they acquire them. Such training might involve education about the firm’s own hierarchies and procedures, as well as about the idiosyncrasies of the firm’s suppliers and clients. It is hard to imagine, however, that most job training imparts skills of this highly specific nature. Indeed, Loewenstein and Spletzer (19??) report that more than half of workers and employers (in their samples for the United States) believe that the skills acquired through training are valuable elsewhere (in addition to being valuable on the current job).

More plausible reasons for thinking that the value of training might tend to decline when trained workers change jobs involve information asymmetries and search costs, and apply even when training imparts skills that are valuable to more than one employer. If the skills are valuable to some, but not all, employers, and if there are costs to finding a match in which the skills are fully valued, then some trained workers who change jobs are likely to move into jobs in which the training is not fully valued. Neal (1995) provides some evidence that many skills are industry-specific in the United States, and that turnover leads some workers to change industries. Frictions in the search process seem especially likely to cause workers to move into jobs that do not fully value their training in developing countries, where the typical scale of production is smaller (and the number of potential employers is thus larger), communication systems are often poor, and unemployment insurance is lacking. Furthermore, inferior knowledge (relative to that of the current employer) about individual workers’ ability may cause potential employers to offer wages below the level of workers’ post-training productivity (Acemoglu and

Pischke, 1996). Second-hand markets for trained workers may not clear, creating the potential that trained workers who leave jobs will not obtain new jobs in which their training is fully valued.

If, for any of these reasons, the value of training tends to fall when workers change jobs, then workers cannot expect their wages to be bid up to the level of their post-training productivity (as realized in the job for which they acquired the training), and employers can hope to reap some of the benefit of training investments. Employers' willingness to bear part of the cost of training investments will depend, however, on the length of the horizon over which they can expect to reap the benefits of training. As pressures for turnover rise, the cost of retaining trained workers and/or the turnover rates among trained workers rise, increasing the cost of pursuing a production strategy requiring any fixed percentage of trained workers.

This section uses evidence from Colombia and the United States to argue that turnover indeed reduces the value of job training. It is based on the observation that the extent to which the value of training investments is retained when workers change jobs has implications not only for production costs and productivity (which we do not observe in household survey data), but also for workers' wage growth over the course of their working lives. If the skills workers acquire through training are general, then as workers accumulate training experiences, their productivity and wages should rise. The rate of wage growth should depend on the rate at which general skills are being acquired, but not on job turnover rates. If, however, turnover diminishes the value of training, then the rate of wage growth, conditional on the rate at which training experiences accumulate, should fall as turnover rates rise.

Given that both job turnover rates *and* the incidence of job training acquired for the current main job are higher in Colombia than in the United States, the comparison of wage-experience profiles for these two countries might shed light on the extent to which turnover diminishes the value of training investments. As developed in Part B below, workers in Colombia appear to accumulate training experiences at a higher rate than their counterparts in the United States, throughout their working lives. Thus if the value of training is undiminished by turnover, wages should rise more rapidly as workers age (or as they acquire general experience) in Colombia than in the United States. If wages rise more slowly over working lives in Colombia, despite the more rapid accumulation of training experiences, then there is strong reason to suspect that turnover reduces the value of training, though alternative explanations must also be considered.

B. Career Training and Turnover Patterns

Training and Turnover Comparisons by Age. The first half of Table 6 reports simple training incidence comparisons by age group, for all male private sector wage employees, and separately for three education levels. The main observation to draw from this table is that at all ages and in all education levels, incidence rates are higher in Colombia than in the United States. But two additional observations are worth noting. For both countries, training incidence among all private sector wage employees is much higher for workers in their twenties than for workers in their teens, and higher yet for workers in their thirties and forties. In addition, at all ages incidence rates in both countries are higher for workers with more formal schooling. These observations, consistent with previous findings for the U.S. (Lillard and Tan, 1992), suggest that a fairly small share of the

training is of the very general sort required to produce good work habits in young workers with little experience in wage employment, and with little school-based experience in such habits.

Table 7 reproduces job retention probability estimates derived, by following synthetic cohorts over time, in Schaffner (forthcoming). Overall job retention probabilities are lower in Colombia than in the United States. This is driven primarily by lower job retention probabilities for workers initially observed in their first year on the job, who predominate in individual cross sections, and whose job retention rates are most precisely estimated. Most important for the current purposes, it is useful to note that the more rapid “rotation” of workers in their first year of tenure in Colombia relative to the United States is observed at all age levels. This suggests that at all ages workers are tending to move through a larger number of jobs in Colombia than the United States.

The higher incidence of job training on the current job at all ages, together with the more rapid rotation through jobs at all ages, suggest that workers tend to accumulate training experiences at a more rapid rate over the entire course of their working careers in Colombia relative to the United States. This observation, together with evidence (presented in the next section) that wages rise more slowly over the course of workers’ careers in Colombia than in the United States, will be used to argue that higher turnover in Colombia leads the value of training to diminish more rapidly over time in Colombia than in the United States.

Training and Turnover by Current Tenure. For higher turnover to cause the value of training investments to diminish more rapidly in the way suggested, the higher turnover rates must be relevant even for trained workers. That is, Colombian employers must not

be concentrating training investments on workers whose turnover rates are as low as those for trained workers in the U.S. Having training incidence measures in only a single cross section in each country, I cannot compare turnover rates across countries for trained workers. Examination of training incidence comparisons by current job tenure, however, cast doubt on the hypothesis that Colombian employers concentrate training investments in this way (though they do not rule it out). The following paragraphs discuss the reasoning and evidence behind this statement.

Employers might use two kinds of information about workers to target training investments toward low-turnover workers, both of which imply that training incidence reports should rise more rapidly with current tenure in Colombia than in the United States. Employers might observe directly and immediately (at the beginning of employment) worker traits associated with low turnover propensities, and concentrate training investments on workers with those traits. (They may also create low turnover workers immediately by paying them higher wages.) Having no need to wait for stable workers to reveal themselves by surviving in the job, they would train the targeted workers at the beginning of their job tenures. Under these circumstances, workers who leave jobs after the first year are largely untrained workers. Thus the percentage of workers in their second year on the job that report having been trained on the current job would be higher than for first-year workers. This effect should be stronger in Colombia, where job retention probabilities for first-year workers are lower.

If employers have little ability to observe directly and immediately workers' turnover propensities, they may choose to delay training investments until lower turnover propensity workers have revealed themselves by surviving in the job some months or

years.³ In the extreme, they could wait several years and concentrate all training investments on high tenure workers whose job retention probabilities are quite high. More generally, they will balance the benefits of delaying training (improved ability to identify low turnover workers) against the costs of delaying training (smaller share of potential tenure over which workers have high productivity). Given the more dramatic increase in conditional job retention probabilities from the first year of tenure to the second or third year in Colombia relative to the United States, one might guess that the benefits of delaying training until the second year are higher. Thus again, if employers are using this approach to concentrate training investments on lower turnover workers, one would expect training incidence reports to rise more rapidly as current tenure rises in Colombia relative to the United States.

The second half of Table 6 presents simple bivariate training incidence comparisons by current job tenure level, for all private sector wage employees, and separately for the three education levels. Table 8 presents training incidence comparisons by current tenure level in a multivariate context. It presents linear probability model estimates that allow assessment of training incidence comparisons by current tenure, after controlling for differences in education level (in a more restrictive way than in Table 6) and for differences in age category (not controlled for in the second half of Table 6). The models, which are run separately for Colombia and the United States, include indicators for all current tenure categories and do not include a constant. The excluded schooling category is “secondary education complete”, and the excluded age category is 20-29. Thus the coefficients on the tenure categories can be interpreted as the average

³ Loewenstein and Spletzer (1996) use NLSY data to document that a significant fraction of workers do indeed have their first experience of training in their second or third year of job tenure in the U.S.

probability of having training in the current job for a 20-29 year old with secondary education complete, in each of the indicated current tenure categories.

According to training incidence comparisons by current tenure level in Tables 6 and 8, higher training incidence in Colombia within education groups is important even for workers in their first year of tenure on the job, and the increases in incidence rates as current tenure increases are not markedly more rapid in Colombia than in the United States. This casts doubt on employer's ability to target training investments on low-turnover workers. Higher turnover rates in Colombia are thus likely to imply higher turnover among trained as well as untrained workers.

C. Wage-Experience Profiles

Methodological Issues. This section seeks to compare across countries how log wages rise as workers accumulate labor market experience. Because the data available for this paper are single cross sections pertaining to workers in private sector wage employment, it is important to consider several reasons why experience (or age) might be correlated with unobserved productivity differences, creating biases in experience effect estimates. It is especially important, because there are good reasons to believe that the importance of these biases differs across the two countries, creating the potential for misleading inferences about cross-country differences in experience profiles. First, the average productivity of entire cohorts (regardless of sector of activity) might be changing over time as schooling systems evolve. In addition, even if the average productivity of entire cohorts has been constant across cohorts, the tendency (stronger in Colombia than in the United States) for workers to transition from private sector wage employment to

self employment as they age, means that private sector wage employees are a more select subset of their cohort at older ages.

Consider first the evolution of the schooling system over time. Two features of the evolution of school systems over the last half century in the two countries might lead to bias in the comparison of experience profile slope coefficients (from log wage regressions conditioning on years of schooling completed). First, while *average school quality* has increased in both countries, it has probably increased more in Colombia (though school quality remains at a much lower level in Colombia relative to the United States). More rapid school quality improvements in Colombia than in the United States would tend to bias Colombian experience profile slopes down relative to those in the United States. Second, schooling attainment has been increasing more rapidly over time in Colombia than in the United States. Increasing attainment probably means that the individuals having attained secondary or higher education levels are less select among younger cohorts than among older cohorts. At the secondary and higher education levels, this probably means declining *average student quality* over time. If this is happening more rapidly in Colombia than in the United States, this would tend to bias Colombian experience profile slopes upward relative to those for the United States. Whether the net effect of these two cohort bias problems is to bias the Colombian experience profile slopes up or down relative to those for the United States is not known a priori.

Two patterns regarding rates of change in schooling attainment and quality in Colombia suggest simple means of assessing the likely importance of related biases. First, rates of change in schooling attainment, and probably in school quality as well, have slowed over time. Thus one would expect biases associated with changes in both

school quality and student quality (conditional on education level) to be smaller among workers educated largely after 1980 than those before. Thus I will include results not only for the entire sample, but also for workers less than or equal to 35 years of age.

Second, quality improvements have been greater, and changes in attainment rates have been smaller, at the primary education level relative to higher education levels in Colombia. In fact, while funding and policy attention has been devoted to improving quality at the primary level, anecdotal complaints from employers suggest that the quality of education may even be falling at the secondary level. Smaller quality improvements, and more rapid reductions in average student quality (resulting from more rapid increases in attainment rates), suggest that the Colombian experience profile coefficients are less likely to be downward biased relative to those for the United States at the secondary and higher levels than at the primary level. Thus I will also disaggregate experience profile comparisons by levels of formal schooling.

Consider now the correlation between experience and average worker productivity arising out of the endogenous selection of private sector wage employees. If especially productive workers are selected into private sector wage employment, and the productivity threshold falls as workers rise, then *the average productivity of private sector wage employees* should be higher for younger cohorts than for older cohorts, and experience would be negatively correlated with unobserved productivity. If, however, the most productive workers have the most to gain from self employment, where they are more likely to be paid their marginal product, then the bias could work in the reverse direction. It is thus useful again to employ estimation methods giving explicit treatment to the endogeneity of selection of the employed into private sector wage employment.

Estimation Results. Table 8 reports estimates of three experience-related coefficients for a variety of models differentiated by estimation method and sample. The first two coefficients are the coefficients on experience and experience squared in linear equations relating the log wage to years of schooling, as well as years of potential labor market experience and its square. The third coefficient is the effect on log wages implied by the first two coefficients of the first 10 years of experience. The three estimation methods are OLS, median regression and the sample selection model discussed in Part III.C above. In most cases when estimating the sample selection models, the null hypothesis that the errors in the selection rule and wage offer equation are independent is strongly rejected for Colombia, and not rejected for the United States. In most cases the regressors that are excluded from the wage equation are jointly significant in Colombian selection rule estimation, but jointly insignificant in the United States.

The robust result is that experience profiles are flatter in Colombia than in the United States. This result is even stronger in models that control for endogenous sample selection than in those that do not. One compelling explanation for flatter experience profiles in Colombia, despite higher rates of accumulation of job training experience, is that higher job turnover rates dissipate the value of job training investments more rapidly.

D. Alternative Explanations

Before concluding that higher turnover rates cause experience profiles to be flatter even in the face of higher rates of accumulation of training experiences, it is important to consider alternative explanations. A first alternative is that training produces skills that obsolesce more rapidly in Colombia than in the United States. The reverse seems more

likely, however, given greater U.S. specialization in high tech and other industries, in which competitiveness requires continual innovation.

A second alternative explanation for flatter wage-experience profiles in Colombia, despite higher rates of accumulation of training experiences, is that workers pay explicitly for training in Colombia while they pay for training implicitly, in the form of lower wages, in the United States. While this cannot be ruled out, two observations cast doubt on its importance. First, Barron, et al. (19??) find little evidence of workers paying implicitly for training in the United States. Second, firm-level data make clear that Colombian employers make direct expenditures for many forms of external training, and not only for on-site training (Tan and Batra). If workers are paying most explicit fees to the training institutions themselves, one would not expect employers' reports of training provision and expenditures to pertain much more to on-site training.

A final alternative explanation for wage-experience profiles that appear steeper in the U.S. than in Colombia is that wages rise with tenure on specific jobs, for contracting reasons unrelated to training. The stronger positive correlation between age and current job tenure in the U.S. than in Colombia (Schaffner, forthcoming) might then bias general labor market experience profile estimates upward to a greater extent in the U.S. than in Colombia. In order to purge the cross country wage-experience profile comparisons of these tenure-related differences, I re-estimated the wage regressions of Table 9 using only observations on individuals in their first year of tenure on the current job. Some of the results are presented in Table 10. Even among such "job starters", wages rise faster with age in the U.S. than in Colombia. Job starters are a more select group among older workers in the U.S. than in Colombia. If job starters are negatively selected, then these

profiles are probably biased more strongly downward in the U.S. than in Colombia. Thus it seems likely that the steeper experience profiles observed in the United States are not just an artifact of observing older workers at higher job tenures.

V. Conclusion

If higher job turnover rates, as well as smaller typical scale of production and inferior stocks of formal schooling, result in lower job training incidence in developing countries relative to developed countries, then job training incidence should be lower in Colombia relative to the United States. It is not. Among workers with similar levels of formal schooling, and among workers in similar production activities, the incidence of job training is in fact higher in Colombia than in the United States. Job training appears to be a prevalent and important practice in developing countries, despite reasons to believe that its relative cost is higher there.

Given the observation that the incidence of job training on the current main job is higher in Colombia than in the United States (for workers in any age group), and that workers tend to move through more jobs as they age, workers appear to accumulate training experiences at a higher rate as they age in Colombia relative to the United States. If this training produces general skills with value that is undiminished when workers change jobs, then wages would be expected to rise more rapidly as workers gain general labor market experience in Colombia relative to the United States, but they do not. The most compelling explanation for the smaller experience effects on wages is that the value of training acquired tends to be eroded more rapidly in Colombia relative to the United States, because workers change jobs more frequently and these job changes tend to erode

the value of the training. This implies that higher rates of job turnover indeed increase the cost of keeping trained positions filled. Further research into the reasons for higher job turnover rates might thus uncover ways of increasing labor productivity by facilitating productivity-enhancing long-term employment contracts.

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