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Upgrading Workers' Skills Not Sufficient To Jump-Start Rural Economy

Enhanced job skills benefit rural individuals, but a high-quality rural labor force by itself will not guarantee rural development. Data from the past two decades show a decreasing rate of growth in demand by employers for quantifiable skills (like level of education). Although policymakers predict an increasingly skilled and service-oriented workforce in the 1990's, a rural development strategy based solely on upgrading workforce skills may still miss the point.

Should more education be the focal point for rural development efforts? Recent analyses of the role of education in rural areas in the 1970's and 1980's are cautionary. Killian and Parker (*RDP*, October-January, 1991) found no significant effect of local educational levels on employment growth in nonmetro areas. Similarly, McGranahan and Ghelfi suggested that weak demand for educated rural workers has been the major problem, not a poor supply of such workers. A close look at the data, in short, casts doubt on the efficacy of enhanced education, by itself, as a strategy for rural development.

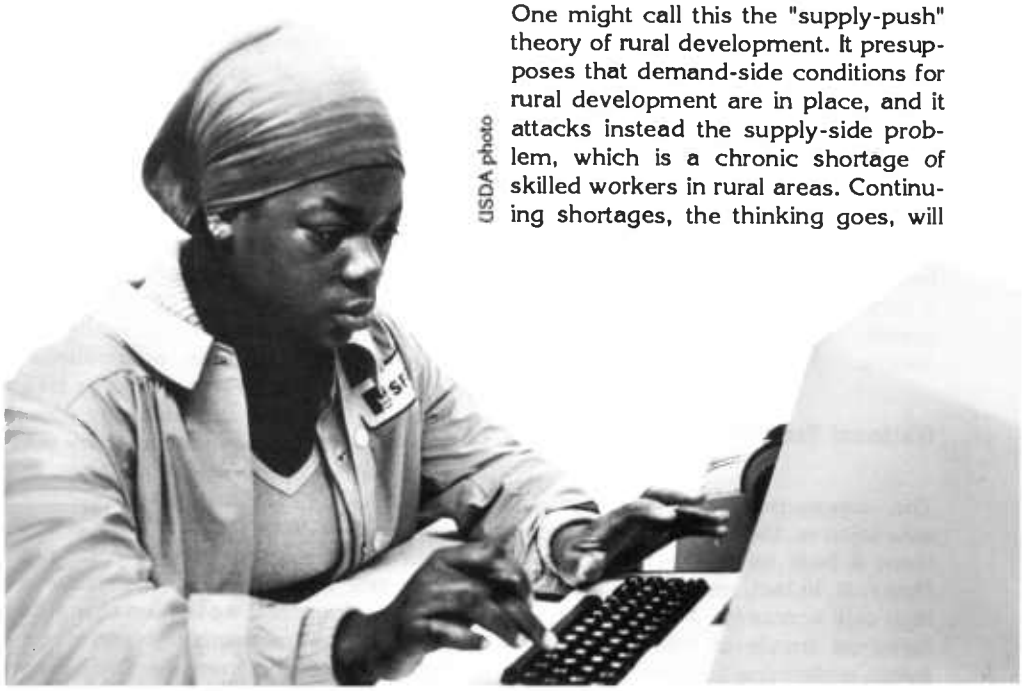
But what if the demand for education is about to skyrocket? Enhancing rural educational levels might then become a more viable focus for rural development efforts. There is a conventional wisdom that supports this viewpoint. In the 1990's, the movement toward a "service economy" will accelerate, increasing the number of skilled jobs and the demand for skilled workers. The slow-growing labor force, however, will be increasingly dominated by disadvantaged workforce entrants with low skill levels, as evidenced by recent trends. This *skills mismatch* between available jobs and available workers could handicap the economy.

But (so this conventional wisdom runs) the skills mismatch itself will provide a great opportunity. While minorities and other disadvantaged workers may now lack the requisite skills to compete in the "new economy," providing them with the education they currently lack will practically guarantee them access to the many high-skill jobs being created.

Whatever its merits, this has become a popular story, as witnessed by numerous press accounts (for example, *Business Week*, Sept. 19, 1988, "Needed: Human Capital"; or *Wall Street Journal*, Feb. 9, 1990, "Education: The Knowledge Gap"). It has also been the view of the U.S. Department of Labor under Presidents Reagan and Bush, a view based on the widely disseminated *Workforce 2000* report, prepared by the Hudson Institute for the Labor Department. This report establishes the context for almost all policy discussions of education and training.

The application of this viewpoint to rural areas is straightforward. Since the skills required for jobs are rapidly increasing, and since rural workers tend to have relatively low educational levels, the skill levels of rural workers must be upgraded to match the skill levels of available jobs. Then, once the "human capital" of rural workers is adequately upgraded, rural development will follow, since employers will be actively seeking supplies of skilled labor.

One might call this the "supply-push" theory of rural development. It presupposes that demand-side conditions for rural development are in place, and it attacks instead the supply-side problem, which is a chronic shortage of skilled workers in rural areas. Continuing shortages, the thinking goes, will



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Skill levels required of jobs in the 1980's accelerated more slowly in nonmetro than in metro job markets.

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Table 1–The effect of occupation employment shifts on skill and education requirements, 1970-2000

Demand for high-skill workers down from 1970's, and likely to be even lower in 1990's

Skill indices	1970-79	1980-88	1988-2000
	Percent change over 10 years[1]		
DOT measures:			
General educational development (GED)	1.77	1.25	0.76
Length of training (SVP)	1.99	1.02	.67
Verbal aptitude	2.19	1.75	.83
Intellectual aptitude	2.02	1.46	.69
Handling data	4.01	3.27	.46
Handling people	1.93	1.99	.80
Handling things	-1.66	-2.69	-.71
	Change in median years of school required		
Education:			
Median years required	.91	.55	.42
	Percentage point change		
Shares of employment requiring:			
Less than high school	-1.34	-.80	-.46
High school graduate	-1.23	-1.24	-.57
Some college	.45	.27	.16
College graduate or more	2.00	1.66	.87

[1]To facilitate comparison of time periods, data were converted to 10-year rates of change–the change that would have occurred if the annual rates of change in each time period had continued for 10 years.

hinder rural development by keeping skill-hungry employers from expanding operations or moving in from other areas.

Contrary to this theory, our analysis of Bureau of Labor Statistics data strongly suggests that demand-side conditions are not changing much. If that is so, there will be no national demand-side explosion in job skills in the 1990's and, even under optimistic scenarios, demand for highly skilled workers will stagnate in rural areas. In fact, rural areas will be lucky to avoid a continuation of the slowdown in skill growth rates experienced in the 1980's.

National Trends in Skill Upgrading

The supply-push theory that touts education as the key to rural development is built on the premise that the Nation is, in fact, moving rapidly into a high-skill economy. However, data on historical trends in job skill requirements undermine this premise.

A recent study analyzed the effects of both industry and occupation shifts on job skill levels from 1960 to 1985 in 267 occupations and 64 industries (Howell and Wolff). It found that, while structural upgrading of job skills took place in each decade, *the rate of upgrading declined substantially over time.* For example, the "substantive complexity" of jobs (see box, "Measuring Skill Requirements") went up 0.69 percent per year in the 1960's, 0.46 percent per year in the 1970's, and only 0.28 percent per year in the 1980's (fig. 1). These results hardly suggest an impending explosion of skills upgrading from structural change.

If these trends continue, occupational upgrading in the 1990's should be **less** than in the two previous decades. This expectation was confirmed by our comparison of historical changes in skill levels (1970-88) with projected changes in skill levels (1988-2000) (table 1). To ensure that we would not miss any evidence of an explosion in skill requirements, we looked at a wide range of skill measures: seven direct measures of skill from the Dictionary of Occupational Titles (DOT), the proxy skill measure of years of schooling required, as well as level of education required using four different education categories.

These data show that, contrary to the conventional wisdom on national skill trends, the move to a "service economy," in and of itself, is not likely to produce a highly skilled job structure. Occupational upgrading trends are not large enough to generate a substantial rise in job skill levels. Furthermore, projected rates of occupational upgrading actually appear to represent a slowdown from upgrading trends in the past, trends that were themselves fairly modest.

For example, job skill levels as measured by the verbal aptitude index went up at a 10-year rate of 2.19 percent between 1970 and 1979 and a rate of 1.75 percent between 1980 and 1988, but are projected to rise in the 1990's at rates only about half the 1980-88 rate (less than two-fifths the 1970-79 rate) (fig. 2). Other skill measures show a similar pattern.

Comparing Rural and Urban Trends in Skill Upgrading

These results weaken the case for an education-based supply-push theory of rural development. If we are not moving into a high-skill economy on the national level, general demand-side conditions appear not to favor a supply-driven rural development policy. Indeed, these results suggest that relatively weak demand for skilled workers might hold back rural development efforts, even if the supply of such workers in rural areas were substantially increased, as the supply-push approach advocates.

The supply-push approach to rural development may still make sense, but only if demand-side conditions for growth in skilled jobs are better in rural areas than this national picture suggests. By comparing rural and urban skill requirement growth on the same set of indicators, we were able to examine this issue. We also examined this growth under different scenarios to reflect the possibility of different relationships between rural and urban job growth in the 1990's.

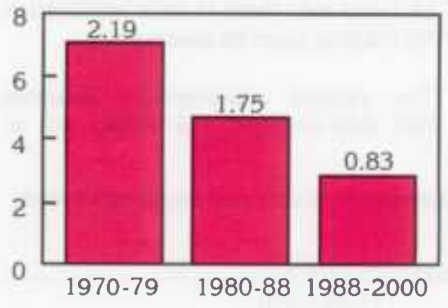
Under the "equal-growth" scenario, we assumed that growth rates in occupational categories will be identical across rural and urban areas (for ex-

Several measures show a decline in job skills from 1970's, especially in rural areas

Figure 1
Changes in substantive complexity of jobs nationwide, 1960-85

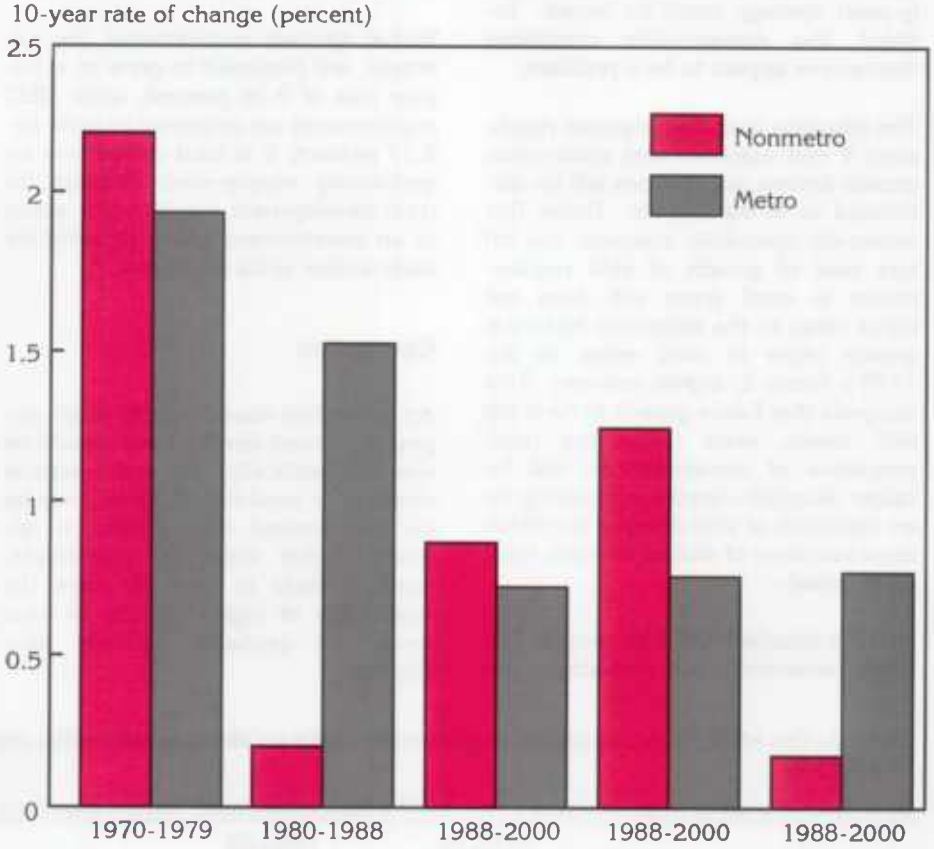
Source: Howell & Wolff (1991).

Figure 2
Changes in verbal aptitude requirements of jobs nationwide, 1970-2000



Source: Authors' calculations.

Figure 3
Metro-nonmetro changes in general educational development requirements of jobs, 1970-2000



Source: Authors' calculations.

ample, executive, administrative, and managerial positions will grow as fast in rural as in urban areas). This is an optimistic assumption, given historical rural disadvantages in generating high-skill jobs.

The results for metro areas alone are fairly similar to the national trends (table 2). They show modest growth in skill requirements in the 1970's, a slight slowdown in this growth in the 1980's, and then a dramatic plunge in skill growth rates in the 1990's, to levels about one-half to one-third that of earlier decades. For example, general educational development (GED) job skill requirements went up at a 10-year rate of 1.94 percent in the 1970's, slowed to 1.51 percent in the 1980's, and under the equal growth scenario are projected to drop to just 0.72 percent growth for the 1988-2000 period, less than two-fifths the 1970's rate (fig. 3). This hardly suggests that skill-hungry metro employers will be driven to rural areas for skilled workers, even if such workers were there.

Table 2 also shows the results for rural areas. The historical data here are particularly interesting. In the 1970's, the decade of the "rural turnaround," rural growth rates in skill requirements of jobs generally exceeded those in urban areas. For example, verbal aptitude and general educational development grew at 10-year rates of 2.82 percent and 2.20 percent in rural areas, compared with 1.69 and 1.94 percent in urban areas.

This relationship changed dramatically in the 1980's. Rural areas experienced a tremendous slowdown in growth of job skill requirements--rates generally less than a fifth and, in some cases, less than a tenth of those in the previous decade--in contrast to urban areas where job skill growth slowed only slightly. For example, in rural areas, growth in data-handling skill requirements fell from a 10-year rate of 4.69 percent in the 1970's to 0.62 percent in the 1980's, and GED growth fell from 2.20 percent to just 0.20 percent. For those same indicators, growth in job skill requirements in urban areas declined only slightly between the two decades. The historical data, then, tell us that demand-side conditions for growth in skilled jobs, not great even in urban areas, are now much weaker in rural areas.

The data in the middle columns of table 2 show that, even under an optimistic scenario of equal occupational growth rates across rural and urban areas, the 1990's hold little promise of an explosion of skill demand in rural areas. Indeed, future rural growth in job skill levels under this optimistic scenario, while an improvement over the extremely low-growth 1980's, would still lag far behind historical

growth rates from the 1970's (or even urban growth rates from the 1980's). Thus, even under generous assumptions, rural areas appear unlikely to generate the demand-side conditions upon which an education-based supply-push strategy could be based. Instead, the demand-side conditions themselves appear to be a problem.

The situation does not improve much, even if one assumes that rural-urban growth among occupations will be distributed as in the 1970's. Under this extremely optimistic scenario, the future rate of growth of skill requirements in rural areas still does not come close to the estimated historical growth rates in rural areas in the 1970's (table 2, eighth column). This suggests that future growth in rural job skill levels, even under the most propitious of circumstances, will be rather sluggish—hardly amounting to an explosion of skill demand for which large numbers of skilled workers must be supplied.

And the situation could be worse. The more pessimistic but probably more realistic scenario, which assumes that rural-urban growth will be distributed according to the 1980's pattern, projects anemic growth in skill requirements of rural jobs (table 2, last column).

Verbal aptitude requirements, for example, are projected to grow at a 10-year rate of 0.26 percent, while GED requirements are projected to grow by 0.17 percent. It is hard to see how an exclusively supply-push strategy for rural development would make sense in an environment where demand for such worker skills is so weak.

Conclusion

An education-based supply-push approach to rural development should be viewed skeptically. The most serious obstacle to rural development may be on the demand side. Efforts to upgrade worker skills, by themselves, seem unlikely to pay off since the availability of high-skill jobs in rural areas will probably increase only slightly.

Two alternative interpretations of our data may yield a more optimistic viewpoint, however. The first is that, while shifts in the *distribution* of occupations will not affect job skill levels, upgrading *within* occupations or job *content change* may (see box, "How Much is the Content of Jobs Changing?"). Such a development would make strong growth in skill demand possible.

Little evidence favors this interpretation, however. A recent survey of employers conducted by the Commission on the Skills of the American Workforce found the reverse: only 5 percent of American employers believe education and skill requirements of jobs are rising significantly, while 80 percent say their primary concern is finding employees with a good work ethic and appropriate social behavior. Thus, while massive change in the content of jobs cannot be ruled out, there is little justification for making such an assumption .

The second interpretation assumes that skill demand and supply are so

Table 2--The effect of occupational employment shifts on skill and education requirements in metro and nonmetro areas, 1970-2000

Slowdown in shift to high-skill jobs since 1970's may undermine "supply-push" development efforts.

Skill indices	1970-79		1980-88		1988-2000					
					Equal growth scenario		1970's growth scenario		1980's growth scenario	
	Metro	Non-metro	Metro	Non-metro	Metro	Non-metro	Metro	Non-metro	Metro	Non-metro
	Percent change in index[1]									
General educational development (GED)	1.94	2.20	1.51	0.20	0.72	0.87	0.75	1.24	0.77	0.17
Length of training (SVP)	2.22	2.17	1.35	.37	.64	.72	.70	.91	.75	.17
Verbal aptitude	1.69	2.82	1.49	.40	.78	.90	.81	1.33	.82	.26
Intellectual aptitude	1.56	2.51	1.23	.16	.67	.69	.69	1.06	.72	.04
Handling data	3.50	4.69	3.16	.62	1.41	1.49	1.48	2.09	1.54	.17
Handling people	1.57	2.25	1.82	.68	.77	.83	.84	1.02	.82	.24
Handling things	-2.20	-1.27	-3.06	-2.16	-.68	-.78	-.81	-.62	-.66	-.58
	Change in median years of school required[1]									
Education:										
Median years required	1.23	.88	.85	.18	.41	.43	.45	.46	.44	.06
	Percentage point change[1]									
Shares of employment requiring–										
Less than high school	-1.08	-2.01	-.66	-.21	-.41	-.57	-.39	-1.04	-.40	-.28
High school graduate	-1.16	-1.16	-1.27	-.37	-.57	-.53	-.64	-.52	-.63	-.05
Some college	.37	.84	.24	.28	.13	.24	.08	.55	.10	.23
College graduate or more	2.06	2.11	1.82	.29	.85	.86	.94	1.02	.93	.10

[1]To facilitate comparison of time periods, data were converted to 10-year rates of change–the change that would have occurred if the annual rates of change in each time period had continued for 10 years.

Measuring Skill Requirements

The most common estimation of skill requirements is the education levels of job incumbents. However, average education level is, at best, a rough proxy for the skills actually needed on the job.

Additional measurements of job skill requirements can be obtained from the Dictionary of Occupational Titles (DOT), a compendium based on survey information collected at irregular intervals by job analysts for the U.S. Employment Services. The DOT includes ratings of the education, training time, physical capabilities, temperaments, and aptitudes necessary for each job listed. The last edition (1977) contained information on nearly 13,000 different occupations.

The specific indices we used from this edition were the general educational development measure (GED), the length of training or specific vocational preparation (SVP) measure, two of the worker aptitudes (intellectual and verbal), and the three worker functions (handling data, people, and things–the last of which is primarily a *physical* skill). (The substantive complexity measure used by Howell and Wolff (fig. 1) is a factor-analytic score created from the GED, SVP, handling data, and several worker aptitudes variables.)

We aggregated from detailed DOT titles to occupational groups by weighting the scores for 1980 Census 3-digit occupational codes* into aggregated groups, using detailed occupational distributions drawn from the 1988 Current Population Survey (CPS) annual averages.

The educational requirements of occupations were estimated by measuring the educational levels of job incumbents (in this case, we used the median educational level within job categories, as well as the proportion of job incumbents with four different levels of education: less than high school, high school graduate, some college, college graduate or more). Education data were drawn from unpublished BLS tables from the March 1988 CPS.

*Obtained from an ICPSR data set put together by Paula England and Barbara Kilbourne.

Measuring the Effects of Structural Change

The effects of structural shifts (the changing distribution of occupations and industries within the economy) on skill levels are estimated by a technique called shift-share analysis. This technique holds skill levels constant *within* categories (for example, the average skill levels of manual and professional jobs remain the same) and then estimates how much overall skill levels are changed just by the shifting job distribution *across* categories (for example, the shift away from manual toward professional jobs). The "shift effect" on average skill levels may then be expressed as an annual rate of change or, as in most of the tables in this article, as a 10-year rate of change.

The occupational shift effects in the figures are based on a shift-share analysis of 11 major occupational groups from the Current Population Survey (CPS). The results here are not sensitive to levels of aggregation (using a larger number of occupational categories). This was true when we compared estimated shift effects for the 1970's and 1980's using two different categorizations: a major CPS occupational categorization, and a categorization developed by McGranahan and Ghelfi with roughly twice as many categories. This was also the case when we analyzed BLS occupational projections with both a CPS major occupation breakdown and a detailed CPS 46-category breakdown.

Data for the 1970 occupational breakdown were taken from the 1970 Census, data for 1979 from the March 1979 CPS, data for 1980 from the 1980 Census, and data for 1988 from the 1988 CPS Earnings file. Data for the 1988-2000 occupational breakdowns were taken from the 1988-2000 BLS projections, crosswalked into 11 major CPS occupational categories. Metro/nonmetro breakdowns by occupation for the 1988-2000 analysis were obtained from the 1988 CPS Earnings file and applied to the national occupational distribution based on the BLS projections.

intertwined that skill supply can, in essence, create its own demand. Thus, if skill demand is currently rising slowly (as our data suggest), then the solution is to increase skill supply rapidly (by pushing up educational levels), thereby encouraging employers to raise job skills rapidly. This will lead, proponents argue, to generally higher skill demand.

Skill supply and demand seldom equilibrate so nicely. In fact, the historical and empirical literature is filled with examples of the relative independence of skill demand and supply. Employers' decisions on workplace skill levels appear to be quite complicated, responsive to a range of factors that includes the skill levels of available workers, but is by no means limited to that. Variation in contemporary U.S. workplaces underscores this point, with certain firms (Motorola, NUMMI, Honda) using relatively high-skill forms of work organization, while employing workers with quite ordinary skill levels. In light of all this, the idea that the true key to increased skill demand is a simple increase in skill supply seems untenable.

Is more education completely useless then? No, for two reasons. First, more education generally does help *individuals* in rural areas. However, the literature is also clear that the more education one has, the more likely one is to migrate out of rural areas. Thus, more education could have the paradoxical effect of helping rural *individuals,* but hurting rural *places.*

Second, if economic circumstances change, rural areas could benefit substantially from higher education levels. This would be the case if the U.S. economy moves onto a "high-skill, high-wage" path during the 1990's, instead of continuing the economic course of the 1980's. In such circumstances, rural educational upgrading could make sense, but only if coordinated with policies for boosting

How Much is the Content of Jobs Changing?

Some say that changes *within* occupations—that is, changes in the *content* of task performance for a given type of job—are producing a high-skill job structure. For example, if computers are now employed extensively within an occupation (say, clerical or bank teller), where they were used not at all 15 years ago, then the average skill level in that occupation may have changed dramatically over the 15-year period. If the number and magnitude of these within-occupation (content) changes are sufficiently high, then substantial skill upgrading could be taking place within the economy, even while the effects of structural (distributional) changes are modest.

The problem with this line of argument is that analysts do not know the amount of content change in the recent past, nor do they have a clear idea of how much is likely in the future. While surveys like the decennial census, Occupational Employment Statistics (OES) survey, and the Current Population Survey (CPS) track changes in industry/occupation distributions, changes in job content are not monitored nearly so closely. For example, while the CPS is done monthly and even the OES is conducted on a 3-year cycle, there has been no new edition of the Dictionary of Occupational Titles—the only survey that tracks job content—since 1977.

Nor does the case study literature provide a clear window onto the direction and magnitude of within-occupation change. It does not say, for example, that where technological changes within occupations have been large, there have been equivalent rises in skill levels. In fact, the change in employment patterns due to a given technology can vary from large increases in skill levels, to small increases to none at all or even *downgrading*. For example, studies of flexible manufacturing systems show similar technologies being deployed in quite different ways in different countries.

This suggests that the magnitude of recent job content change cannot be estimated with much precision and one should be cautious in assessing the future direction of content change. Nevertheless, overlap between three sources of information—the scholarly literature, journalistic accounts, and the accumulating testimony of the Nation's business community—allows one to draw some limited conclusions. First, jobs today are more likely to require at least threshold levels of literacy and numerical skill. Second, some jobs in "best practice" firms within certain industries are being substantially upgraded (for example, workers independently solve technical problems, learn new tasks on a fairly regular basis, interact with fellow workers as part of a "team"). Third, such "best practice" firms are *not* the norm in the U.S. economy today (though they are becoming more numerous over time).

Much of the current talk about extensive job upgrading seems, therefore, an exaggeration of the limited upgrading actually happening in contemporary workplaces. What accounts for this exaggeration? In our view, much of it is wishful thinking.

People are aware of the potential of new information technologies being tapped within workplaces by our economic competitors, view this as desirable, and assume U.S. firms must be moving down the same path. But the realities of technology adaptation, as outlined above, are much more complicated.

rural demand for high-skill workers. Policies might include, for example, making rural areas more "urban-like" by providing the information infrastructure needed to support the relatively high-skill sectors of the economy. Demand-oriented policies, in the long run, are more likely to help rural areas prosper than a single-minded focus on upgrading the educational levels of rural workers. RDP

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