# Telecommuting: The Trade-Offs of Home Work 

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## Several large-scale studies find that relatively few people use their bome as a primary work site and that those who do balance their needs for employment flexibility against their needs for income.

The popular image of telecommuting is captured in a cover of Forbes, the business magazine, showing an empty freeway leading to a deserted metropolis and the plaint, "It's 8:45-Do you know where your employees are?" Popular and scholarly predictions of massive telecommuting-"the partial or total substitution of telecommunications, with or without the assistance of computers, for the twice-daily commute to work" (38, p. 301) -have been based on three assumptions.

The first might be thought of as the technological imperative: As an increasing proportion of the U.S. work force does information work, new computer and telecommunication technology may permit new flexibility in work arrangements (e.g., 5, 10, 20, 21, 27, 32, 39, 41, 42, 47, 50). At the extreme, Toffler (50) argues that new technology will lead to "electronic cottages" and will radically transform work in the United States. More cautiously, Olson (42) sees office automation technology-the electronic storage, retrieval, manipulation, and communication of records, messages, documents, and other informationas freeing office workers from the confines of a standard 9 -to- 5 business day in a conventional office. Because white-collar workers need not be on site to receive, send, and act on the information they need to do their jobs, they can work whenever and wherever their circumstances and their employers allow them to.

The second assumption behind a prediction of massive telecommuting involves corporate initiative: Corporations will use the new information technology to change their styles of operation because of the personnel benefits that telecommuting would provide them (e.g., 24, 36, 47). In particular, employers whose professional or managerial employees work at home generally expect two gains: a larger pool of scarce, skilled labor, and increased productivity from that labor. Professional workers who might be more available as a result of home work are those who need to mesh family and work obligations (e.g., female heads of households or members of dual-career families) and
those in regions of the country with a more abundant labor supply. Employers also can acquire more skilled, cheaper, and more docile clerical labor by coupling home work with an arms-length employment relationship to their employees-for example, by hiring them as independent contractors rather than as regular employees (e.g., 18, 44) or by recruiting from among suburban second-income earners rather than urban primary wage earners (37).
Although the data on how working at home affects productivity are spare and of poor quality, they suggest that home workers are more productive than office-based workers. For example, pilot projects reported at a National Academy of Sciences symposium (36) unanimously concluded that telecommuting increased productivity. Both clerical and managerial home workers typically increased their output from 15 to 25 percent, based on a variety of subjective and objective measures. It is not yet possible in most studies, however, to untangle the effects of novelty, self-selection, and longer work hours from the effects of work location.

The final assumption underlying predictions of massive telecommuting is that this work style would support a number of trends in the labor supply. In particular, the increasing employment among women, especially married women with young children, may lead to more interest in working from home.

But even if telecommuting does not grow as predicted, paid employment performed at home is an interesting lens through which to examine the impact of information technology on the structure of employment. In addition, telecommuting resurrects a century-old public policy concern (55). Recent discussions of home-based work have revolved around two conflicting images: an optimistic one based on case studies of home-based workers using computer technology ( $24,42,46,50$ ) and a pessimistic one rooted in labor history ( 8,11 , $14,25,56)$. The optimistic image emphasizes the flexibility that home-based employment provides; the pessimistic image emphasizes the exploitation traditionally endured by home-based workers and their families.
Are these concerns warranted? Have large numbers of people begun working from home using computers and telecommunications? What motivates individuals and organizations to adopt or not adopt home-based employment? How does this work style affect individuals and the organizations that employ them? These questions remain unanswered in part because important distinctions between different types of home-based employment have been blurred. In addition, the empirical base that informs predictions and pronouncements has been woefully inadequate. This article attempts to draw distinctions between different types of home-based work and to review empirical evidence about the numbers of people who work from home and their motivations, as well as the consequences of their home work for them and their organizations.

Estimates of how many people work at home, who they are, and projections of future trends vary widely, depending on how home work is defined. The primary classification variable is the extent (in number of hours) to which a person performs any income-producing work at home. This variable can be treated continuously, with each hour making a person a little more of a

home worker, or dichotomously, so that only people working at home over a threshold of hours are classified as home workers. Failing to distinguish the degree to which people work at home leads to massive differences in estimates of the home working population. In addition, as will be discussed later, people who work only a few hours per week at home differ in important ways from those who work from home most of their time.

The second major criterion for classifying home work is whether work is for a primary employer or a secondary one. By asking only about work location for the primary employer, federal statistics have explicitly excluded moonlighters and others who work at home on a secondary job. On the other hand, commercial surveys typically ask about work location for any job.

With these distinctions in mind, let us consider the various estimates of the numbers of people who work from home, ordered by their size. A 1982 A.T.\&T. marketing study (2) estimated that 23 million people performed jobrelated, income-producing work from home. Based on a 1985 Current Population Survey (CPS), a 1986 report estimated that 17.3 million people, representing approximately 16 percent of the labor force, do some work at home for their primary employer (23). A 1987 proprietary survey by Electronic Services Unlimited ( 15 ; see also 27) estimated that 15.8 million corporate employees, representing approximately 15 percent of the civilian, nonfarm labor force, worked at home either part time or full time. All three of these high estimates included people who performed any income-producing work at home. The CPS focused on work done for a primary employer, while the two commercial surveys broadened the definition to include work done for any employer.
If we use more restrictive definitions of home work, estimates are scaled back dramatically. For example, Kraut and Grambsch (30) reanalyzed data from the 1980 U.S. decennial census (51). Home workers were considered those who indicated, in answering a question about means of transportation to work, that their home was their principal place of work that week. Respondents were asked only about their primary job and primary workplace, thus eliminating
people who moonlight from home on a second job, work from home only occasionally, or supplement on-site employment by working at home in the evenings and weekends. These data show that 1.3 million people, or 1.6 percent of the nonfarm, civilian labor force, work at home as their primary place of employment on their primary job-a percentage that had fallen by half since 1960 (30). Using the CPS data, Horvath (23) found that in the non-agricultural industries, about 1 million people, or 1 percent of the relevant labor force, worked 35 hours per week or more at home and that 1.8 million people, or about 2 percent of the relevant labor force, worked at home exclusively, the majority for less than 35 hours per week.

In summary, disagreements about definition cause confusion about how much home work exists. Fifteen to twenty percent of the nonfarm labor force work at home at least some of the time, but less than two percent do so for substantial parts of the work week.

Compounding these definitional differences are methodological difficulties that lead to undercounts of the total numbers of home-based workers and obscure distinctions among them. These methodological problems can lead to inaccurate descriptions of home work and can mislead those who make private and public policy.

One major methodological problem is that much research draws on information that is recorded less reliably for home workers than for conventional workers. This is true even for such fundamental information as the number of hours worked, because the boundary between employment and personal activity is more blurred for home workers. In addition, they are more likely to be parttime workers, who sometimes forget short bursts of paid employment. Similarly, the distinction between self-employed and employee status is less clear for home workers than for conventional workers, both because of employers' practices and because of conflicting definitions administered by the Internal Revenue Service (IRS) and the U.S. Labor Department (58).
A second methodological problem is that many people who actually work at home are unwilling to say so. Since much home work is part of the underground economy, home workers may fear revealing the existence of work that was not reported to the IRS, that violates zoning ordinances, or that they believe compromises their loyalty to their primary employer. On the other hand, some respondents may fabricate an at-home business or at-home work to acquire tax advantages or company perquisites.

Finally, since even generous estimates find that a relatively small proportion of the labor force works at home for a substantial length of time, research on home workers' characteristics requires large samples, often beyond the means of standard small-scale academic or even commercial research to collect. The need for large samples is especially important in focusing on the characteristics of subgroups of home workers, such as those employed in traditionally abusive industries, undocumented immigrants, or female heads of household with young children. The A.T. \&T. survey, with its sample of less than 300 respondents, and even the CPS survey, with its sample of more than 60,000 respon-
dents, may be too small to answer some questions of scholarly or public policy interest.

The difficulty in identifying large samples of home workers has led many researchers to describe "opportunity samples," unrepresentative of any known population, often without an explicit comparison to conventional workers. This may produce misleading and overly generalized conclusions in which the attributes of self-employed or part-time workers or of women workers generally are confused with the attributes of home workers.

## We can distinguish among three variants of home workers: substitu-

 tors, self-employed, and supplementers. Substitutors are those who substitute work done at home for work done in a more conventional work setting. It is they who have deserted the freeways in the Forbes cover that introduced this article.Most commentators assume that substitutors are primarily employees of larger organizations who spend part or all of their work week at home or at other nontraditional sites, rather than in a traditional office. The evidence that will be reviewed here, however, shows that this style of telecommuting is more myth than reality. Two other styles of home-based employment are far more common: operating a home-based business, and bringing supplementary work home from a conventional office.

Every national sample that can identify people who work at home for a substantial amount of their work week shows that self-employment is a major component of this work style. For example, data from the 1980 census show that, among people who work at home as their primary place of employment for their primary employer, home-based business people were clearly dominant. A total of 2.2 million people worked at home according to this definition, of whom 1.3 million, or 62 percent, were self-employed, either owners of an incorporated business or employees of their own unincorporated business. Among comparable on-site workers, only 9 percent were self-employed (30).

Using CPS data and a more inclusive definition of home-based work, Horvath (23) showed that the more people worked at home, the more likely they were to be self-employed. Thus, over 50 percent of those who worked at home 35 hours or more per week were self-employed, compared to only 30 percent of those who worked at home between 8 and 34 hours per week.

Among the commercial surveys, Electronic Services Unlimited (15) found that almost 60 percent of work-at-home households were running a business from home; A.T.\&T. found that 45 percent were (2). According to the A.T.\&T. and CPS studies, those with home-based businesses were primarily in service industries, especially business and repair, social and child care services, and other professional services, including law and architecture.

Presumably, the self-employed reduce their overhead costs substantially by working from home, using their household budgets to subsidize rent, utilities, and other business costs. Working from home also enhances the freedom from supervision and schedules for which many people create their own businesses.

Supplemental home work is the major way that managerial and professional employees work at home. The data suggest that they do so to increase their output by performing overflow work in the evenings or on weekends or by working in an environment freer from distraction and interruption than the conventional office. One can get a sense for supplemental home work by examining the distribution of time spent working at home for different workers. Although about 70 percent of all employed managerial and professional specialty workers reported some home work in Horvath's study (23), 52 percent of them worked less than 8 hours per week at home, and only 3 percent worked at home 35 hours per week or more.

Among engineers, mathematicians, and computer scientists, for example, about 25 percent report some home work, but less than 2 percent of those work at home 35 hours per week or more. Similarly, over 80 percent of teachers report some home work, but over 50 percent of those who work at home do so for less than 8 hours per week, and less than 1 percent work at home 35 hours per week or more. From these CPS data one can speculate that the typical pattern for the wage and salary worker is to work in the evenings and on weekends to supplement conventional, office-based work. Presumably, for example, teachers are preparing lessons and grading papers at home.
Smaller-scale surveys also show that most managerial and professional workers work at home, but only occasionally and then to supplement rather than substitute for conventional office work. Of more than 900 middle managers and professionals surveyed in eight Fortune 100 firms, half reported working at home with their computers in addition to going to the office, while only 3 percent reported working at home instead of going to the office ( 40 , reported in 38, p. 304). In a survey of 958 data processing professionals, Olson (43) found that 45 percent worked at home, 65 percent of them in addition to their regular work hours. Home work primarily supplemented more conventional work arrangements, to increase productivity and control over the pacing and style of the work performed. Only 6 percent did all their work from home, and only 27 percent worked at home either regularly or occasionally as a substitute for office-based work.

The A.T.\&T. survey described above (2) reported that 30 percent of those who were employed outside the home brought work home with them; most had white-collar office jobs in the information sector. For example, 88 percent of those who brought work home were in managerial, professional, technical, sales, or administrative support occupations, compared to only 52 percent of those who brought no work home.

According to the A.T.\&T. study, those who brought work home from a conventional job differed from others who used their home as their primary workplace (including those who ran a business from home). The home-based business people worked at home to mesh their desires for independence with their family and work responsibilities; supplemental home workers worked at home because the tasks they performed required a concentration that was unobtainable in a conventional office. For example, those who brought work home saw being able to work without interruptions as the major advantage, although they
were frustrated by the difficulties of arranging access to much of the information they needed. On the other hand, those with a business at home said that being with their families and enjoying flexible hours were important reasons for working from home. They were also more likely to believe that home workers can enjoy their independence, earn money, and be with their children at the same time (2).

Asked in a 1987 Electronic Services Unlimited survey to list the most important reasons they first decided to work at home, home-based business people rated earning extra money as their most important reason. On the other hand, people who performed after-hours home work reported that they worked at home primarily to catch up on their work or to do extra work (15).

Almost 50 percent of managers and professionals in my study of a research and development company (28) worked at home, generally on a supplemental basis. They worked at home an average of 7.5 hours per week (i.e., the equivalent of a full working day) but also worked 36.5 hours at a company location. Supplemental home workers tended to be higher-status, better-educated employees who put in almost a third more time on the job per week than employees working exclusively on site.

A comparison of the type of work done by managers and professionals at home and in their conventional office, based on their own estimates, is presented in Table 1. In general, employees used their conventional offices for social tasks and their homes for cognitive tasks. When these employees worked at home they were more likely to read and write and to write computer programs, and less likely to talk to colleagues face-to-face or on the phone. These results were confirmed in in-depth interviews, where respondents stressed the

Table 1: Tasks performed in the office and at home by managers and professionals ( $n=153$ )

|  | Office | Home | $\dagger$ (home <br> > office) |
| :--- | :--- | :--- | :---: |
| Cognitive tasks |  |  |  |
| Read | 1.02 | 1.50 | $5.0^{*}$ |
| Write | 0.78 | 1.16 | $4.6^{*}$ |
| Program | 0.28 | 0.86 | $2.1^{*}$ |
| Social tasks |  |  |  |
| Talk about work (face-to-face) | 1.30 | 0.16 | $-7.3^{*}$ |
| Talk about nonwork (face-to-face) | 0.18 | 0.08 | -1.5 |
| Attend meetings | 0.28 | 0.00 | $-3.9^{*}$ |
| Telephone | 0.72 | 0.39 | $-3.9^{*}$ |
| Electronic mail | 0.34 | 0.67 | $4.3^{*}$ |

Source: Kraut (28).
Entries have been standardized within location. A 0 indicates that an activity was never performed at a given location, and a 1 indicates that an activity was performed one standard deviation more frequently than other activities at that location.
$p<.04$.
need to do work requiring sustained concentration as a major motivation for working at home.
Although it provides no comparison with activities in a conventional work location, the A.T.\&T. study (2) shows that the dominant activities done by employees at home were cognitive: reading papers, memos, magazines, articles, and books, preparing schedules, or writing letters, notes, and memos. In addition, many home workers made telephone calls, but short ones; these were not substitutes for office meetings.

In summary, while the popular image of telecommuting stresses substitution of work at home for work in an office, in reality self-employment and supplementary home work are far more common. The self-employed seem to want freedom from supervision, flexibility, and extra income from their home-based business. On the other hand, supplementary home workers seem to want freedom from distraction and extra time to complete projects that did not fit into the standard business day.

## Why-despite the popular image of telecommuting and the "electronic cottage"-have we seen so little employer-initiated workplace substitu-

 tion? Large employers hesitate to embrace a distributed work force mainly because conventional office arrangements support a large number of activities crucial to the functioning of any work organization. The defining component of the conventional office is the copresence of other workers for substantial parts of the work day. People who need to talk to each other because they are in the same department or work on the same projects have desks in the same office, hallway, wing, or floor of a building. Physical proximity is the technology organizations use to support the informal communication that underlies much group work and the social relationships attendant upon this communication $(16,61)$.Organizations need to coordinate and control the activity of their members. In large organizations, some coordination is accomplished by adherence to common rules and regulations (e.g., a corporate procurement guide or statement of personnel practice) or through traditional hierarchical reporting relationships. But in the face of novelty, uncertainty, and unstructured environmental conditions, informal communication is needed to gain new information, clarify values, evaluate alternatives, and make decisions (45). It is for this reason, for example, that managers spend almost 50 percent of their work day in unscheduled meetings (48). Much communication in organizations results from people bumping into each other in hallways, in lunchrooms, or by the copier. It would not occur if the organizational members were separated by even 100 or 200 yards (1), much less if they were working from their homes.

Informal communication supported by physical proximity serves many functions in organizations. It is frequently the basis of supervision, socialization, social support, on-the-job training, and the spread of corporate know-how and culture. Moreover, the informal communication among coworkers helps provide the major satisfaction denied to home workers-socializing and friendly social interaction (31).

It is primarily when demands for coordination are lowered-for example, when work tasks are self-contained or routine-that large organizations dabble in home-based employment. For example, management consultants identify jobs appropriate for telecommuting as having encapsulated characteristics: "work that can be performed independently of others and, if necessary, be integrated into the whole later," "project-oriented. . .activities, with tasks involving a structured flow of information," and "routine information handling" (27). And when organizations use home-based workers, they typically follow this advice. For example, a British firm that hired both home-based and office-based software developers used the former for smaller projects with microcomputers. These projects involved fewer people, took less time, and were more self-contained; in short, they required less interdependency and internal communication (4).

Yet these routine jobs are rarer than imagined. Even data entry or other clerical work requires rich knowledge of the organization and substantial internal communication to handle the inevitable and often frequent exceptions to the routine (e.g., 29, 49). Managerial and professional work typically requires even more knowledge and communication. Until decision-makers become convinced that they can support informal communication with a distributed work force, they are unlikely to be lured to telecommuting by claims of cost savings or enlarged labor pools.

## "Primary" home workers-people who work at home for substantial periods of time, whether self-employed or organizational employeesare likely to have different motives than "supplementer" home work-

 ers. Two studies are relevant to the motivations of primary home workers and the consequences for them of working from home. The first, by Kraut and Grambsch (30), uses demographic and income data from the 1980 U.S. census to infer motivations and economic consequences of working from home. The second, by Gerson and Kraut (19), is a national survey of clerical workers in typing bureaus. Together these studies suggest that primary home work is a form of marginal labor force participation, like part-time work and contract labor (3). It can increase employment flexibility for those whose physical or social constraints make it difficult for them to be employed full time outside the home. Thus, the disabled, the elderly, mothers of young children, and rural residents are among those most likely to work from home.But flexibility comes at a price; people who work at home earn less, have less income stability, and have fewer fringe benefits than other workers. Because of these lower earnings, home-based work appeals most to those with a lowered need for their own earned income-for example, married women whose husbands can provide health benefits, and those with larger household incomes.

Table 2 provides some basic descriptive information from the 1980 U.S. decennial census comparing white-collar home workers with white-collar onsite workers, separately for men and women. Compared to on-site workers, home workers were overwhelmingly self-employed or employees of their own

Table 2: Descriptlve statistics for white-collar, nonfarm workers who worked "Iast week" on site versus af home

|  | On site |  | Home |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Men $(n=23.648 \mathrm{~K})$ | Women $(n=26.936 \mathrm{~K})$ | Men $(\mathrm{n}=371.2 \mathrm{~K})$ | Women $(n=456.0 K)$ |
| White | 91.1\% | 87.9\% | 95.6\% | 96.1\% |
| Age | 38.8 years | 36.1 years | 46.8 years | 43.3 years |
| Education | 14.8 years | 13.5 years | 14.6 years | 13.5 years |
| Rural residence (non-SMSA) | 13.0\% | 14.0\% | 15.0\% | 17.0\% |
| Married couple household | 57.1\% | 31.9\% | 44.9\% | 54.0\% |
| Own children at home | 44.7\% | 42.5\% | 32.0\% | 47.6\% |
| Preschool children at home | 17.9\% | 13.2\% | 10.8\% | 19.7\% |
| Work-limiting disability | 4.9\% | 3.2\% | 10.6\% | 7.1\% |
| Part-year or part-time work | 25.8\% | 51.8\% | 40.6\% | 74.0\% |
| Self-employed or employee of own corporation | 14.0\% | 3.7\% | 65.0\% | 50.8\% |
| Wages and self-employment income (all white-collar workers) | \$18.0K | \$8.0K | \$12.0K | \$3.OK |
| Wages and self-employment income (full-time white-collar workers) | \$20.0K | \$10.8K | \$17.0K | \$8.1K |
| Below poverty cutoff | 2.6\% | 4.1\% | 8.3\% | 6.7\% |

Source: 1980 decennial census.
corporation. Home workers were also far more likely than on-site workers to work part time. Table 2 shows that 59 percent of home workers and only 40 percent of on-site workers worked less than 35 hours per week or less than 50 weeks per year, with perhaps a quarter of this part-time employment being involuntary (57, Table A-31). As Horvath (23) and Table 2 show, home workers who work only part time are primarily women, which suggests that they use both part-time work and work from home as a way to achieve time flexibility in employment.

The attributes of other home workers suggest that they too need extra flexibility in dealing with employment. Logistic regression analyses (see 30) show that home workers were more likely to be older than on-site workers, to live in a rural rather than an urban residence, and to have a work-limiting or transpor-tation-limiting disability. More concretely, being ten years older, living in a rural rather than an urban environment, and being disabled each increased the odds of working at home about one and a half times.

The finding that being older increases the odds of working at home deserves additional explanation. For nonblacks, the probability of working at home increases at all ages between 16 and 80, but the rate of increase steepens appreciably around the retirement age. In part this is because older people have limited employment options with conventional employers, face mandatory or voluntary retirement, are less physically vigorous, or prefer shorter commutes.

The age effect, however, may not simply reflect limited employment opportunities. As people become older they also become more established and may have amassed the resources-experience, clients, or capital--for home-based work. Finally, the association of age and home work may be partially a cohort effect. Older people who started their work experience earlier in the century did so at a time when the climate for working at home was more favorable, with higher rates of both home-based work and self-employment (59); their current work arrangements may be an outgrowth of these earlier decisions.

A final demographic correlate of primary home work is the availability of other household income over and above the home worker's earned income. In 1980, the odds of working at home were increased by one and a half times for each $\$ 30,000$ that household income exceeded wage, salary, or self-employment income, even holding constant marital status and other demographic and family characteristics associated with income (see 30). As we will see, people who work primarily at home typically earn less than those who work in conventional locations. The finding that people are more likely to work at home if they have other household income available is consistent with the hypothesis that they are using other household resources to subsidize their disadvantaged place of employment.

Unlike men, women use home work as a mechanism to combine family responsibilities with paid employment. Women, because of their traditional association with the home and because of their greater domestic responsibilities (including child care), might be thought more likely than men to work at home. Yet, overall, this was not the case.

For men, being married halved the odds of working at home. The presence of children had little effect.

For women, the picture is much more complex. The relationships are most easily shown by plots of the probability of working at home for women of different family structures and races. We used multivariate, logistic regression to construct a model explaining who worked at home. ${ }^{1}$ Based on that model, Figure 1 shows the probability of working at home as a function of the presence of children, for black married women, black unmarried women, nonblack married women, and nonblack unmarried women, controlling for age, education, urbanization, disability, and other household income. Marriage decreased the probability of working at home for black women but increased the probability for nonblack women. Living with children (especially young children) increased the probability of working at home for both black and nonblack women, but only if they were married. Finally, for women (as well as for men), nonblacks were more likely than blacks to work at home, but this effect was much larger for married women.

The interactions among sex, race, and family structure illustrate the equilibrium between income and flexibility needs. Consider first the case of marriage. Because of sex roles, married women have nonpaid work demands on them

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Figure 1: Time use for home and office workers
that are not shared by men. Overall, women do about 70 percent of all unpaid household work, including child care. The sex-typing of housework is so deeply set in our culture that the basic household tasks typically are not redivided when a wife enters the labor force $(6,60)$. For women, unpaid housework increases when they get married, whether they are employed or not,
although the increase is somewhat smaller for employed women (60). Consistent with these sex-role obligations, we found that marriage increased the proportion of nonblack women who worked at home, at least when they had children. They could handle more of their domestic responsibilities if they worked from home. Furthermore, other evidence (described below) from Gerson and Kraut (19) suggests that wives underwrite their costs of employment through marriage, for example by participating in their husbands' health insurance plans and by using their communal residences as offices. This also explains why people are more likely to work at home if they have family income beyond their own wages, salaries, and self-employment income.

Increased household-maintenance demands on women are especially powerful when they are mothers. Women with children, especially young children, have exceptional constraints placed on their time and often require increased employment flexibility to handle the dual demands of child care and paid employment. Not only do they have extra housework, but the work is often unpredictable: children get sick, schools close, or child care arrangements collapse. Women do almost all of the extra work associated with child care, whether or not they are employed outside the household. Again, consistent with these sex-role obligations, women (both nonblack and black) were more likely to work at home if they had children, especially young ones, but men were not.

Raising children requires money as well as time. Although unmarried women with children have the same flexibility needs as married women, they were less able to afford the income loss associated with home work. As a result, only for married women does the presence of children increase the odds of working at home. Indeed, for unmarried women the presence of school-aged children decreased somewhat the odds of working at home, presumably because these women had strong financial needs but lessened flexibility needs.

In contrast to these findings for nonblack women, marriage decreased the odds of men and black women working at home. Two related explanations seem likely. The first, an economic one, asserts that the marginal increase in household income from employed nonblack women is relatively small, while the increase in household labor from them is relatively large. Men's earnings are higher than women's, and men and black women are likely to be the primary wage earners in a household. Therefore, the household has more to lose if men and black women work from home than if nonblack women work from home.

The second explanation emphasizes the differential family and work obligations of men and women and of black and nonblack women. In particular, married men are likely to have to be the main financial support of their households. (The same may be true of black women as well.) As a result of these breadwinner obligations, married men can ill afford the income drop that is associated with home work. In addition, to the extent that home-based work is atypical in the United States and does not appear to be "real work" (e.g., 12), it does not project a public image for men that they are breadwinners. They may not be able to afford the image of not "going to" work.

Table 3: Effects of home work on income for white-collar workers
$\left.\begin{array}{llll} & \begin{array}{l}\text { Income of } \\ \text { on-site } \\ \text { (conven- } \\ \text { tional) } \\ \text { workers (in } \\ \text { (in }\end{array} & \begin{array}{l}\text { Proportion of } \\ \text { income of } \\ \text { an on-site } \\ \text { worker re- } \\ \text { ceived by a } \\ \text { home worker }\end{array} & \begin{array}{l}\text { \% in } \\ \text { occupa- } \\ \text { tion } \\ \text { working } \\ \text { at home }\end{array} \\ \hline \text { S1,000s) }\end{array}\right]$

Source: 1980 decennial census.
A home worker's income differs reliably from that of a conventional worker at $\mathrm{p} \leq .05$.

## Home workers earn less money per year than conventional workers, even if they work full time, and are more likely to live in families

 below the poverty line. When people restrict their labor options, they often pay a price in lost income (e.g., 33). Home workers in other eras often earned less than comparable factory workers (e.g., 8, 14), and this appears to be true of contemporary home workers as well.The findings of lower earnings for home workers remain when one controls for demographic and job-related variables known to influence income or the probability of working at home. We used multiple regression, examining the effect of work location on the sum of wage and salary income and self-employment income. To control for time worked, we included in the analysis only individuals reporting full-time employment ( 50 or more weeks of work and 35 or more hours of work per week). In this way we reduced the bias created by the tendency of home workers who work part time to forget small intervals of work (52). This correction, however, is likely to lead to a conservative estimate of the negative impact of home-based employment on earnings.

The regression looked at the effect of home work on annual earnings (in the log scale) for full-time workers, controlling for age, degree of urbanization, race, years of schooling, self-employment, the family structure variables, the
presence or absence of disability, and some interactions of these variables. The top two lines of Table 3 show that working at home has a negative effect on income for both men and women, an effect that is both statistically significant and large in real-world terms. Overall, home workers working full time received 70 percent of the income of conventional workers. Controlling for occupation by subtracting the mean income of a respondent's occupational group from his or her own income resulted in only minor changes. In this analysis home workers earned only 76 percent as much as conventional workers.

The bottom section of Table 3 looks at the impact of home work on income for each of several occupations separately. We chose occupations with sufficient numbers of home workers and nonhome workers in the data set for the results to be believable and reliable. We found 17 such occupations, spanning the spectrum of white-collar occupations, including managerial, clerical, sales, technical, and professional positions. The results show a clear negative impact of working at home on income. In 9 of the 17 occupations, home workers earned significantly less than on-site workers, and in none did they earn significantly more. The weighted average of the home work effect indicates that, on average, home workers earned only 78 percent as much as nonhome workers.

The estimates we provided on the incomes of home workers and conventional workers underrepresent the total compensation gap between them, because they do not include differentials in part-time work or in fringe benefits. The study described next shows that this loss of fringe benefits can be substantial.

## A survey of clerical home workers allows us to directly assess people's motives for working at home and the choices they make in doing so.

The census data permit only inferences on these matters. They also restrict data on the individual costs and benefits of home-based employment to financial considerations and allow only crude statistical controls. To overcome these limitations, Gerson and Kraut (19) conducted a survey of home workers in secretarial services, which has a population sufficiently large to support a national random sample and is in the forefront of the push to use computers and telecommunications to support home work (cf. 12, 36, 42, 46). By limiting our investigation to one occupational group in one industrial sector we also eliminated possible variation attributable to occupation and industry.

Our sample of 297 women came from 222 small secretarial, typing, and word-processing establishments that advertised in the Yellow Pages of 24 medium-sized cities (populations about 100,000 ) across the United States. Respondents were selected for the survey if they could handle a request to type a thirty-page handwritten manuscript with several tables and equations. Eighty-three of these secretarial workers, or 28 percent of the sample, worked at home exclusively or as their primary place of employment. Eighty-three percent of the home workers and 87 percent of the on-site workers used computers as part of their jobs.

Many of the results from this survey confirm those from the census data but

## Table 4: Home workers' explanations, motives, and enabling conditions for working from home ( $\mathrm{n}=83$ )

| Statement | Rating |
| :--- | :--- |
| I want flexibility in the way I schedule my time | 4.7 |
| I want freedom from supervision | 4.2 |
| I can eliminate commuting | 4.0 |
| I don't need to deal with other people very much | 3.9 |
| My expenses are less | 3.8 |
| I can get more work done at home | 3.6 |
| I've had previous on-the-job training in a regular office | 3.2 |
| I have child care or other family responsibilities | 3.1 |
| I need freedom from distraction | 3.0 |
| My employer requires it | 2.8 |
| I don't like other people very much | 2.5 |
| I cannot find work in a regular office | 1.1 |

Source: Gerson and Kraut (19).
Responses were made on five-point Likert scales ( $1=$ strongly disagree, $5=$ strongly agree ).
allow a level of detail previously unavailable. For example, in this sample home workers, compared to conventional workers, were older, more likely to be married, and more likely to have preschool-aged children.

Previously we had speculated that certain social characteristics such as disability, rural status, old age, marriage (for women), and the presence of young children (for women) all constrain people's employment choices. In particular, the extra time burden that women assume when they are married and have children and the unpredictability of these time commitments often conflict with the scheduled time demands of a conventional job. Home work partially reconciles this conflict by increasing women's flexibility in scheduling the time they spend in domestic labor and in paid employment. Analytically, we treated these social characteristics as constraints that limit choice. Do home workers perceive their personal or familial situation as limiting their choice and forcing them to work at home?
We asked both home workers and office workers to rate the relative advantages and disadvantages of the home and the conventional office as work sites. They were asked to respond, on five-point Likert scales ( $1=$ strongly disagree, 5 = strongly agree), to statements that they "work at home because, ..." "want to work at home because, . . ." or "can work at home because. . . ." Results for home workers are shown in Table 4. Given the relatively high proportion of married women with young children among this group, it is not surprising that scheduling flexibility was one of the strongest reasons offered for working at home. Having a more flexible life-style is one of the few options available to women fulfilling the oft-competing demands of domesticity and paid work.

These data confirm that women are motivated to work at home to gain time flexibility. But they do not necessarily perceive themselves as forced into this work arrangement. When asked directly about their choice of work location, home workers were reliably more likely than office workers to state that their "place of work is based on. . .personal preference." Moreover, home workers
disagreed strongly with explanations suggesting strong extrinsic constraints on work location (working at home because they were unable to find conventional employment or because they had an employer who required home work). Explanations that emphasized changes in the work process, such as getting more done, being less distracted, and having a self-contained job, were ranked between these extremes of time flexibility and external constraint.

Overall, then, home workers perceive themselves as having more choice than office workers over work location; constraint, to the extent that it exists, is perceived as internally rather than externally generated. Home workers with young children, however, were an exception to other home workers. They were more likely to attribute working at home to the need to provide child care, and they were less likely to affirm that their work site was a matter of personal preference.

Home workers thus choose a work location in part to bave time for domestic labor, and, indeed, they devote more time to domestic work than office workers. Home workers spent approximately nine more hours weekly performing both housework and child care duties, according to respondents' reports of the number of daily hours they, other family members, and paid helpers spent doing domestic labor. The "child care division of labor," a ratio of the number of hours respondents spent on child care divided by the number of hours child care was provided by other family members and paid helpers, revealed that home workers assumed a larger share of child care work than office workers.

Working at home did not result in savings on child care costs, however. Home workers paid significantly more per year on child care than office workers, controlling for demographic characteristics, household income, and the number of young children in the family.

Home work was associated not only with women performing more domestic labor but also with when they performed it. Figure 2 plots the proportion of home workers and conventional workers performing paid and domestic labor during the course of the day. It shows that home workers were more likely than conventional workers to mix paid employment with domestic labor, both doing domestic chores and child care during the conventional business day and extending their paid employment to the early morning and evening. Interestingly, a similar plot of the distribution of recreation and leisure (not shown here) does not show leisure creeping into time reserved for paid employment. Thus, these women are willing to interrupt their paid work to prepare dinner and take care of children, but they do not do so to watch TV or chat with friends.

This pattern of using home-based employment to effect a compromise between the need for scheduling flexibility and the need for paid employment is consistent with the more traditional attitudes of home workers compared to office workers. As seen in Table 5, the strongest differences between the two groups involved attitudes regarding sex roles. Home-based workers were less likely to agree with statements advocating a shared household division of labor,


Figure 2: Probability of working at home for women
equal employment opportunities for women and men, and other ideas expressing egalitarianism between women and men (34). Home workers also placed greater emphasis on religion and less on career advancement. Both home and office workers expressed attitudes that highly valued the family. This value configuration suggests that home workers are making decisions about work sites that are consistent with their personal belief systems. These women believe that they ought to assume the major responsibility for housework and child care, and they have downplayed their careers. Thus, when family and employment conflict, they compromise by working at home, often part time, where they can still fulfill some family obligations.

Of course, scheduling flexibility to mesh the demands of employment and family is not the sole motivation for working at home. Many people work at home to start a business, in part to achieve the autonomy that business ownership provides. Freedom from supervision was the second most important reason offered for working at home, after scheduling flexibility. Among the clerical workers in this sample, home workers were more than twice as likely as office workers to own the firm for which they worked (see Table 5).

Just as home workers and office workers have different motivations for work, their work also provides them with different outcomes and satisfactions. Some of the results from the clerical sample confirm and extend the findings from the more general census study described earlier.
Although they were doing the same tasks, home workers achieved 83 percent of the annual earnings of office workers from their employer. These secretarial home workers earned less than their office counterparts primarily because they worked fewer hours per week. They were also less likely to receive fringe

Table 5: Differences between home $(\mathrm{n}=83)$ and office $(\mathrm{n}=216)$ clerical workers

|  | Home $\bar{x}$ | Office <br> 区 | $\begin{aligned} & \dagger \text { (home } \\ & >\text { office) } \end{aligned}$ |
| :---: | :---: | :---: | :---: |
| Demographic characteristics |  |  |  |
| Married | 79\% | 51\% | $5.0 *$ |
| Age | 42.4 years | 36.6 years | $3.6{ }^{*}$ |
| Preschool children | 25\% | 13\% | 1.8 |
| Labor force characteristics |  |  |  |
| Owner | 70\% | 33\% | $5.4 *$ |
| Hours worked per week | 33.8 hours | 41.1 hours | -2.9* |
| Weeks worked per year | 42.9 weeks | 42.9 weeks | 0.0 |
| Seniority in firm | 5.1 years | 3.3 years | $2.1{ }^{*}$ |
| income and benefits |  |  |  |
| Income from firm | \$8.5K | \$10.2K | 0.1 |
| Household income | \$37.6K | \$31.4K | $2.4 *$ |
| Paid by profits | 40\% | 22\% | $3.3 *$ |
| Paid piece rate | 53\% | 17\% | $4.7 *$ |
| Paid salary | 7\% | 39\% | -2.4* |
| Own health benefits | 14\% | 29\% | $-3.1{ }^{*}$ |
| Household health benefits | 48\% | 56\% | -0.4 |
| Social security | 27\% | 61\% | $-5.4{ }^{*}$ |
| Overtime | 10\% | 30\% | -3.7* |
| Vacation | 6\% | 49\% | $-7.4 *$ |
| Unemployment insurance | 8\% | 43\% | $-5.9{ }^{*}$ |
| Pension | 11\% | 9\% | 0.5 |
| Work and social environment |  |  |  |
| Job quality indexa | 4.28 | 4.26 | 0.7 |
| Role conflicto | -0.13 | 0.03 | -2.1** |
| Social supportb | 0.14 | -0.02 | 2.2* |
| Daily hassles ${ }^{\text {b }}$ | -0.70 | 0.79 | -1.8 |
| Psychological variables |  |  |  |
| Job satisfaction ${ }^{\circ}$ | 4.56 | 4.27 | $2.4{ }^{*}$ |
| Depression/anxiety ${ }^{\text {b }}$ | -1.00 | 0.23 | $-2.3{ }^{*}$ |
| Happiness ${ }^{\text {b }}$ | 0.13 | -0.04 | 1.6 |
| Values ${ }^{\text {b }}$ |  |  |  |
| Agreement with traditional sex roles | 1.82 | 0.80 | 4.2* |
| Importance of family | -0.02 | 0.05 | -0.8 |
| Importance of religion | 0.20 | -0.05 | $2.0 *$ |
| Careerist orientation | -0.40 | 0.23 | -2.2* |

Source: Gerson and Kraut (19).
a Responses were made on a five-point Likert scale ( $1=$ strongly disagree, $5=$ strongly agree).

- Measures were transformed to $Z$ scores.
- $\mathrm{p} \leq .05$.
benefits, including health benefits, employer-paid social security, unemployment insurance, overtime pay, and paid vacation, from their own employment (see Table 5).
We were able to estimate workers' total compensation by adding the dollar value of benefits they received (53) to their income from their firms. By this
estimate, home workers received only 71 percent of the total compensation of office workers. Home workers' personal income was also more at risk than that of office workers, since it was more likely to be obtained through profits from the firm or piece rates than from a stable salary (see Table 5).

Financially, home workers were able to handle their lower overall personal income, smaller benefit packages, and greater unreliability in their income because they were more likely to be married than office workers. As a result, they were often able to use their husbands' income and health benefits as a safery net for themselves and their families. Because they were married, home workers had larger household incomes than office workers and were as likely to be covered by health benefits. We suspect that they were able to psychologically handle their lower earnings because work and career were not as important to them as they were to office workers (see Table 5).

Taken together, these data are consistent with a view that individuals make what appear to be personal employment decisions in the context of (and often for the benefit of) the larger social and economic units of which they are a part (7). Home-based clerical workers can meet family needs for child care and domestic labor, indulge their traditional work and role attitudes, or satisfy their needs for autonomy or entrepreneurship because they are in a family unit that subsidizes their work style. As we saw in the census data, needs for flexibility do not typically lead to home-based employment unless the rest of the family can subsidize the lost income.

## The study of clerical workers allowed us to examine the social and emotional effects of home work as well as its economic outcomes. Sev-

 eral participants in the public policy debate on home work (e.g., 11, 35, 54) have decried the working conditions for some nonmanagerial home workers and their effects on home workers' psychological states. But, on the contrary, our data suggest that among the clerical workers in secretarial services, home workers are as satisfied with their working conditions as office-based workers and often more so.These data, however, are simply descriptive and carry no claim that work location is a cause of differences in employment conditions or psychological states. Rather, they probably reflect substantial self-selection, in which women move into and out of working conditions until they find one in which they can feel satisfied. This degree of choice is possible only in the relatively full employment market that has characterized secretarial work for much of the decade.

We combined measures of job autonomy, challenge, involvement, impact, and pressure (9) to define high-quality jobs as ones that have impact on others, are not too pressured, and provide the incumbent with involvement, challenge, and autonomy. Table 5 shows that office workers and home workers in secretarial services did not differ on this dimension.

The literature suggests that, because home workers are subjected to family and work demands simultaneously, they may experience more role conflict and
overload than office workers. As measured by scale items taken from Cammann et al. (9), however, the home workers we surveyed reported less role conflict and overload. That is, they reported that they were less frequently interrupted, that they had fewer others making demands on them, and that demands on them from their work and family lives were not incompatible.

In part, home workers' relative freedom from conflict and overload results from their having significantly fewer people around them when they worked (an average of .7 vs. 1.3 persons for office workers). But home workers also actively sought a less stressful work environment, employing techniques to prevent interruption that office workers did not use. For example, they were more likely to report that they worked in an isolated place like a private office or study, at a time when no one was around, or at off hours.

Another worry is that, because they are isolated, home workers have little social support in their personal and their work lives. Our data offer no simple answer on this point. As measured by the Interpersonal Support Evaluation List (13), compared to office workers, home workers were more likely to report having a supportive social environment (see Table 5). They described themselves as having available more people who could provide tangible assistance like money or transportation, who could provide feedback about problems and concerns, and with whom they could participate in social events.

On the other hand, when we asked about specific work and household tasks, home workers had less help than office workers. For example, home workers were less likely to have others to help them solve work-related problems, such as equipment malfunction or work overflow. Moreover, as described previously, women who worked at home did more household chores than office workers and performed a higher proportion of household maintenance and child care.

To measure stress, we used items from the Hassles Scale (26), which asks respondents to rate the severity of daily life stressors such as troublesome neighbors, planning meals, not having enough money, hassles from boss or supervisor, or having too many things to do. Compared to office workers, home workers reported experiencing slightly fewer minor stressful events on a daily basis (see Table 5).

Using a scale from Gove and Geerken (22), we measured life happiness by asking respondents to indicate the extent to which they felt that things were going their way, were pleased with accomplishments, and were excited about and interested in events in their lives. We also measured job satisfaction using two items from Cammann et al. (9): "All in all, I am satisfied with my job" and "In general, I don't like my job." Compared to office workers, home workers reported being happier and more satisfied with their jobs (see Table 5).

On the other hand, work location was not associated with the extent to which respondents were anxious or depressed during the month preceding the survey. The measures used were compiled by Gove and Geerken (22) from a number of epidemiological surveys of minor psychological distress. They included such symptoms as feeling so blue or depressed as to interfere with daily activities; being in low spirits; feeling apart or alone even among friends;
feeling anxious; bothered by nervousness, irritability, fidgetiness, or tenseness; and feeling restless.

Whether home work is "valuable" depends on the category considered,
particularly the distinction between supplemental home work and priparticularly the distinction between supplemental home work and primary home work. At the level of private policy, both employers and individual workers want to know whether home working is valuable to them. At the level of public policy, legislators and regulators want to know whether contemporary home workers are being exploited (54).

Supplemental home work is likely to be valuable for organizations and for workers. The benefits, however, are not those of recruiting or cost savings touted in the popular literature. Organizations cannot use home work or telecommuting to recruit skilled professionals from a wider geographic area or to reduce office costs merely by encouraging employees to work at home occasionally. Rather, they are likely to achieve difficult-to-pin-down productivity gains from supplemental home work.

When people work at home, they are typically less distracted and interrupted than at the office. Having sustained periods for thinking, reading, writing, and planning presumably is productive for these workers and for the companies that employ them. Occasional home work also gives employees some scheduling flexibility to deal with exceptional or unplanned events, ranging from dentist appointments to emergency child care. Although policies supporting supplemental home work may encourage some professionals and managerial workers to work longer than the conventional forty-hour work week at home, they are often working long hours anyway and are exempt from the Fair Labor Standards Act's rules for overtime pay.

If this analysis is correct, then employers could benefit by adopting policies that support supplemental home work and occasional workplace substitution. The policies should include flexible work procedures that allow people to work from home rather than from the office, as projects require. In addition, as offices change so that more information is available in electronic form, and electronic mail and file transfers are more widely used, employers should subsidize equipment and telecommunications costs of working at home.

Employers would probably benefit from supplemental home work and from occasional substitution of work at home for work in a conventional office. But it is less clear that they would benefit from primary home work. Physical proximity is the only technology that adequately supports informal communication, which is crucial for coordinating activities. Because home workers are typically cut off from informal communication channels and therefore less well integrated into an organization's structure and culture, they are likely to be less valuable to their employers than conventional employees.

For example, they are less likely to have witnessed other people's work in the organization and therefore less likely to be able to take over others' responsibilities or take on new responsibilities without explicit instruction. They are
less likely to know of the personal relations among organizational members and thus the undocumented procedures for getting tasks accomplished. And because they are not on site, they are less available for brief episodes of unplanned work; it is hard to ask them a quick question or enlist their support for completing an urgent project. For any organization and job, identifying the point at which the costs associated with poorer communication balance the gains associated with better concentration is likely to be a matter of trial and error.

Although employers are unlikely to benefit from primary home work, however, a minority of individuals can, in two distinct ways. First, working from home allows some people to start and run a small business. They subsidize the business with their household budget, in particular by sharing space and utilities, and thus reduce the risks associated with entrepreneurship. Many of these new businesses are short-lived; of the successful ones, many move to separate quarters outside the home (2).

Second, some people benefit from home-based employment because this is the only way they can participate in the labor force. Both employees and the self-employed who work at home for substantial periods of time frequently have physical, geographic, or family constraints on where or how they can work. For many of them, a decision to work at home is based on a compromise between their needs for flexibility in employment and their needs for earned income. Many home workers explicitly report that acquiring flexibility was their major motivation for working at home, and demographic groups who seem to need greater flexibility -mothers of children (especially young children), rural residents, the physically disabled, and the elderly-are overrepresented among home workers.

Using the home as a work location is truly a compromise, though, and our data show that it is not a panacea. Home workers typically earn less in wages and have fewer fringe benefits than conventional workers. In addition, because they frequently work part time and are self-employed, they have less wage stability as well. As a result, they typically work at home only if their wages supplement family income rather than constitute its sole source and if they have fringe benefits, especially health insurance, available from a spouse or another source. Thus, for example, while having young children increases women's needs for flexibility, unmarried women with young children are no more likely to work at home than other women, because their needs for income and health insurance counteract their needs for flexibility.

Moreover, our data suggest that home work is more attractive to people with certain value orientations. For women, working from home ties them more tightly to domesticity. If they work at home, for example, they are more likely than if they worked in a conventional office to take a larger share of household responsibilities and to mix their domestic labor with their paid employment. This way of life is congruent with traditional sex-role values and a deemphasis on career. On the other hand, women who are more concerned about a career might find that home work is a poor compromise.

## Determining whether the wage gap between home workers reflects

 exploitation is an empirically difficult problem and a fundamentally value-laden one. Yet public policy about home work depends on deciding whether home workers are being exploited by employers who take advantage of the constraints on employment that domestic responsibilities or disability impose on some workers $(54,56)$.Understanding the wage differential between home workers and conventional workers requires understanding three related issues. The first is the degree to which the differences in wages are part of a larger pattern of unfavorable working conditions. The second is the degree to which the wage differences can be attributed to other "legitimate" determinants of wages, such as workers' attributes, the industries in which they work, or the jobs or tasks they perform. The third is the degree to which workers freely choose this work arrangement. At the extreme, one would classify home work as exploitative and try to regulate it if it consisted of adverse conditions that workers were forced to accept and that were not the result of legitimate labor market mechanisms. On the other hand, as the disadvantages of home work lessen, are attributable to legitimate labor market forces, or are more freely chosen, analysts are less likely to consider them signs of exploitation that require legal scrutiny or regulation.

We do not know the extent to which home workers are subjected to other negative working conditions besides low wages, such as child labor, unsafe environments, withholding of wages without recourse, and avoidance of gov-ernment-mandated benefits, including social security, disability, and unemployment compensation contributions. Citing long hours, substandard wages, poor and unsafe working conditions, and child labor, the U.S. Department of Labor issued regulations that banned some industrial home work in the 1930s. Most of these bans have been repealed in the 1980s. If similar exploitative conditions characterize contemporary home work, there might be cause to heed the AFL-CIO's call for a similar ban on computer-based home work (11).

It is possible, however, that the wage differences reflect the efficient operation of the labor market. If home workers provide less value to those who pay for their services, then even large wage differentials may be justified.

In the analyses presented here, the wage differential between home workers and conventional workers remained after controlling for occupation. This control, however, may not have been sufficient. People in the same occupation can provide very different services that are differentially valued by their employers or clients. For example, home-based lawyers earn less than half of what officebased lawyers earn, yet it is likely that they are doing different work. The home workers are probably handling routine cases for individuals, involving real estate, tax, or personal injury law; many of the office-based lawyers might be engaged in corporate law-finance, corporate restructuring, and international trade-with much more at stake. To examine this possibility would require more detailed job descriptions than the census provides. The data from Gerson and Kraut (19) showing differences in total compensation among clerical workers doing very similar work in small secretarial service firms hints, though, that

the compensation differences cannot be totally attributed to gross differences in job responsibilities.

The differences in job content between home workers and office workers may be more subtle. We have argued that home workers are less valuable than conventional employees to their employers because they are often cut off from informal communication channels and are less well integrated into an organization's structure and culture. Bailyn's (4) case study, which shows that software developers worked on smaller projects if they worked from home rather than from their employer's central facilities, illustrates this point. In general, home workers' isolation from the informal information flows in an organizationwhich is perhaps the major reason that institutions have not adopted home work-may also explain home workers' lower wages.

The classification of a wage gap as fair or exploitative also depends in part on whether home workers have freely chosen their work arrangement. People with restricted geographic mobility in general do not maximize their earnings $(17,33)$; they simply cannot go to the best jobs. This may partially explain home workers' lower compensation.

However, if home workers choose their immobility because they are trying to maximize other variables-for example, family income rather than personal income, fulfillment of traditional family responsibilities, convenience, or freedom from supervision-we would not consider this earnings differential
exploitative. As the clerical study showed, many home workers believe that they have substantial choice in their employment decisions, even though these decisions come in response to a set of constraining personal, familial, and geographic circumstances. Home work is but one of the strategies people can use to meet their flexibility needs and still maintain their ties to the labor market. Others include self-employment, part-time work, and temporary work (3). From among these alternatives, home work seems to appeal to those with traditional values.

In summary, the finding that home workers receive substantially lower compensation than conventional workers is open to multiple interpretations. If contemporary home work is associated with the systematic abuses of traditional industrial home work, it is exploitative and regulation is in order. On the other hand, the wage differential may reflect the labor market's compensation of less valuable work, or it may reflect home workers' choices given those values they feel are most important. To date there is little compelling evidence that allows us to choose among these alternatives.

## References

1. Allen, Thomas. Managing the Flow of Information. Cambridge, Mass.: MIT Press, 1977.
2. American Telephone and Telegraph. The Structure of the Work-at-Home Market: Job/Volunteer/ School. Basking Ridge, NJ.: A.T.\&T., 1982.
3. Applebaum, Eileen. "Restructuring Work: Temporary, Part-Time, and At-Home Employment." In H. Hartmann (Ed.), Computer Chips and Paper Clips, Volume 2. Washington, D.C.: National Academy Press, 1987, pp. 268-313.
4. Bailyn, Lotte. Toward the Perfect Workplace? The Experience of Home-Based Developers. Working paper 1993-88. Cambridge, Mass.: Sloan School of Management, Massachusetts Institute of Technol ogy, March 1988.
5. Becker, F. and C. McClintock. "Mixed Blessings: The Office at Home." Paper presented to the National Telecommunications Conference, Houston, March 23-25, 1981.
6. Berk, Sarah Fenstermaker. The Gender Factory: The Apportionment of Work in American Housebolds. New York: Plenum Press, 1985.
7. Bonfield, E. H., Carol Kaufman, and Sigfredo Hernandez. "Household Decision Making: Units of Analysis and Decision Processes." In M. L. Roberts and L. Wortzel (Eds.), Marketing to the Chang. ing Housebold: Management and Research Perspectives. Cambridge, Mass.: Ballinger, 1984, pp. 231-263.
8. Cadbury, E., M. Matheson, and G. Shann. Women's Work and Wages. London: T. Fisher Unwin, 1906.
9. Cammann, Cortlandt, Mark Fishman, Douglas Jenkins, Jr., and John R. Klesh. "Assessing the Attitudes and Perceptions of Organizational Members." In Stanley E. Seashore, Edward Lawler, Fillip H. Mirvis, and Cortlandt Cammann (Eds.), Assessing Organizational Cbange. New York: John Wiley, 1983, pp. 71-138.
10. Castro, Janice. "Staying Home Is Paying Off." Time, October 26, 1987, pp. 112-113.
11. Chamot, Dennis and John Zalusky. "Use and Misuse of Workstations at Home." In National Academy of Sciences (Ed.), Office Workstations in the Home. Washington, D.C.: National Academy Press, 1985, pp. 76-84.
12. Christensen, Kathleen. Women and Home-Based Work: The Unspoken Contract. New York: Henry Holt, 1988.
13. Cohen, Sheldon, R. Mermelstein, T. Kamarck, and H. Hoberman. "Measuring the Functional Components of Social Support." In Irwin G. Sarason and B. Sarason (Eds.), Social Support: Tbeory, Research and Applications. The Hague: Martinus Nijhoff, 1985.
14. Daniels, C. R. "Between Home and Factory: Homeworkers of New York, 1900-1914." In "Working Mothers and the State." Unpublished Ph.D. dissertation, Department of Political Science, University of Massachusetts, Amherst, 1985, pp. 42-81.
15. Electronic Services Unlimited. Preliminary tables from the national home work survey. New York, 1987.
16. Festinger, L., S. Schachter, and K. Back. Social Pressures in Informal Groups: A Study of Human Factors in Housing. New York: Harper \& Row, 1950.
17. Frank, Robert. "Family Location Constraints and the Geographic Distribution of Female Professionals." Journal of Political Economics 86, 1978, pp. 117-130.
18. Geisler, G. "Blue Cross/Blue Shield of South Carolina's Program for Clerical Workers." In National Academy of Sciences (Ed.), Office Workstations in the Home. Washington, D.C.: National Academy Press, 1985, pp. 16-23.
19. Gerson, Judith and Robert E. Kraut. "Clerical Work at Home or in the Office: The Difference It Makes." In Kathleen E. Christensen (Ed.), The New Era of Home-Based Work. Boulder, Colo.: Westview Press, 1988, pp. 49-64.
20. Giuliano, V. "Teleworking: Future Shock." Telephony 200, 1981, pp. 56-62.
21. Giuliano, V. "Teleworking: A Prospectus." Telepbony 200, 1981, pp. 67-75.
22. Gove, Walter R. and Michael R. Geerken. "The Effect of Children and Employment on the Mental Health of Married Men and Women." Social Forces 56, 1977, pp. 66-76.
23. Horvath, F. W. "Work at Home: New Findings from the Current Population Survey." Monthly Labor Review 109, 1986, pp. 31-35.
24. "It's Rush Hour for "Telecommuting.'" Business Week, January 23, 1984, pp. 99-102.
25. Johnson, Laura. The Seam Allowance: Industrial Homework in Canada. Toronto: Women's Press, 1982.
26. Kanner, Allen D., James C. Coyne, Catherine Schaefer, and Richard S. Lazarus. "Comparisons of Two Modes of Stress Measurement: Daily Hassles and Uplifts versus Major Life Events." Journal of Behavioral Medicine 4, 1981, pp. 1-39.
27. Kelly, Marcia M. "The Work-at-Home Revolution." The Futurist 22, November-December 1988, pp. 28-32.
28. Kraut, Robert E. "Telework as a Work-Style Innovation." In R. E. Kraut (Ed.), Tecbnology and the Transformation of Wbite-Collar Work. Hillsdale, N.J.: Lawrence Erlbaum, 1987, pp. 49-64.
29. Kraut, Robert E., Susan Dumais, and Susan Koch. "Computerization, Productivity and Quality of Employment." Communications of the ACM 32, 1988, pp. 220-238.
30. Kraut, Robert E. and P. Grambsch. "Home-Based, White-Collar Work: Lessons from the 1980 Census." Social Forces 66, 1987, pp. 410-426.
31. Locke, E. "The Nature and Causes of Job Satisfaction." In M. Dunnette (Ed.), Handbook of Indus. trial and Organizational Psychology. Chicago: Rand McNally, 1976, pp. 1297-1349.
32. McClintock, C. "Working Alone Together: Managing Telecommuting." Paper presented to the National Telecommunications Conference, Houston, March 23-25, 1981.
33. Marwell, Gerald, Rachel Rosenfeld, and Seymour Spilerman. "Geographic Constraints on Women's Careers in Academia." Science 205, 1979, pp. 1225-1231.
34. Mason, Karen Oppenheim and Lawrence L. Bumpass. "U.S. Women's Sex-Role Ideology, 1970." American Journal of Sociology 80, 1975, pp. 1212-1219.
35. Mattera, Philip. "Home Computer Sweatshops." The Nation, April 2, 1983, pp. 390-392.
36. National Academy of Sciences (Ed.). Office Workstations in the Home. Washington, D.C.: National Academy Press, 1985.
37. Nelson, K. "Back-Offices and Female Labor Markets: Office Suburbanization in the San Francisco Bay Area." Unpublished Ph.D. dissertation, Department of Geography, University of California, Berkeley, 1984.
38. Nilles, Jack M. "Traffic Reduction by Telecommuting: A Status Review and Selected Bibliography." Transportation Research-A, 22A No. 4, 1988, pp. 301-317.
39. Nilles, Jack M., F. R. Carlson, P. Gray, and G. Hanneman. Telecommunications/Transportation Trade-Offs: Options for Tomorrow. New York: John Wiley, 1976.
40. Nilles, Jack M., Mohrman El Sawy, and F. Pauchant. The Strategic Impact of Information Technologies on Managerial Work. Los Angeles: Center for Futures Research, University of Southern California, 1986.
41. Olson, Margrethe. "New Information Technology and Organizational Culture." MIS Quarterly 6, 1982, pp. 71-92
42. Olson, Margrethe. "Remote Office Work: Changing Work Patterns in Space and Time." Communications of the ACM 26, 1983, pp. 162-187.
43. Olson, Margrethe. "Do You Telecommute?" Datamation, October 15, 1985, pp. 129-132.
44. Olson, Margrethe. "Telework: Practical Experience and Future Prospects." In Robert E. Kraut (Ed.), Technology and the Transformation of White-Collar Work. Hillsdale, N.J.: Lawrence Erlbaum, 1986, pp. 135-152.
45. Ouchi, William G. "Markets, Bureaucracies, and Clans." Administrative Science Quarterly 25, 1980, pp. 129-141.
46. Pratt, Joanne H. "Home Teleworking: A Study of Its Pioneers." Technological Forecasting and Social Cbange 25, 1984, pp. 1-14.
47. Schiff, F. W. "Flexiplace: An Idea Whose Time Has Come." IEEE Transactions on Engineering Management EM-30, 1983, pp. 26-30.
48. Sproull, Lee. "The Nature of Managerial Attention." In L. Sproull and P. Larkey (Eds.), Advances in Information Processing in Organizations. Greenwich, Conn.: JAI Press, 1984.
49. Suchman, Lucy and Eleanor Wynn. "Procedures and Problems in the Office." Office: Technology and People 2, 1984, pp. 113-154.
50. Toffler, Alvin. The Third Wave. New York: William Morrow, 1980.
51. U.S. Bureau of the Census. "Census of Population and Housing, 1980: Public-Use Microdata Sample A [MRDF]." Washington, D.C., 1980.
52. U.S. Bureau of the Census. User's Guide to the Public Use Micro Sample for the 1980 Census. Washington, D.C.: U.S. Government Printing Office, 1983.
53. U.S. Chamber of Commerce. Employee Benefits, 1985. Washington, D.C.: U.S. Chamber of Commerce, 1986.
54. U.S. Congress. House of Representatives. Committee on Government Operations. Home-Based Clerical Workers: Are They Victims of Exploitation? House Report 99-677. Washington, D.C.: U.S. Government Printing Office, 1986.
55. U.S. Congress. Office of Technology Assessment. Automation of America's Offices. OTA-CIT-287. Washington, D.C.: U.S. Government Printing Office, 1985.
56. U.S. Department of Labor. Report on the Condition of Women and Cbild Wage-Earners in the U.S. Washington, D.C.: U.S. Government Printing Office, 1911.
57. U.S. Department of Labor. Employment and Earnings. Washington, D.C.: U.S. Government Printing Office, January 1985.
58. U.S. Department of Labor, Employment Standards Administration, Wage and Hour Division. Employment Relationship Under the Fair Labor Standards Action. WH Publication 1297. Washington, D.C.: U.S. Department of Labor, March 1979.
59. U.S. Government. Employment and Training Report of the President. Washington, D.C.: U.S. Government Printing Office, 1981 [stock number 029-100-00410-2].
60. Vanek, Joanne J. "Household Work, Wage Work, and Sexual Equality." In Sarah Berk (Ed.), Women and Housebold Labor. Beverly Hills, Cal.: Sage, 1980.
61. Zipf, G. Human Behavior and the Principle of Least Effort. Cambridge, Mass.: Addison-Wesley, 1949.

## Selected Bibliographic Resources on the Social Impact of Communication Iechnologies

Cutcliffe, Stephen H., Judith A. Mistichelli, and Christine M. Roysdon (Eds.). Technology and Values in American Civilization: A Guide to Information Sources. Detroit: Gale Research. 1980. Part 22, "Journals and indexing Services," Section A: "Journals Regularly Publishing Articles Relating to Technology and Values."
Forester, Tom (Ed.). The Information Technology Revolution. Cambridge, Mass.: MIT Press, 1985. See "Guide to Further Reading" following each chapter and "General Guide to Further Reading."

Harwood, Felicity with Graham Thomas. Science, Technology, and Innovation: A Research Bibliography. New York: St. Martin's Press, 1984.
MacKenzie, Donald and Judy Wajcman (Eds.). How the Refrigerator Got Its Hum: The Social Shaping of Technology. Milton Keynes: Open University Press, 1985. See "Other Areas of Study" and "Bibliography."

Melody, William H., Dallas W. Smythe, Robin E. Mansell, and Ursel Koebberling. Communication, Information, and Culture: Annotated Bibliography. Department of Communication. Simon Fraser University, August 1985.

Musmann, Klaus and William H. Kennedy (Compilers). Diffusion of Innovations: A Select Bibliography. Westport, Conn.: Greenwood Press, 1989.
O'Conghaile, W. and V. Di Martino (Eds.). New Technology and the Quality of Life: Service Sector in Europe. (An annotated bibliography.) European Foundation for the Improvement of Living and Working Conditions. Luxembourg: Office for Official Publications of the European Communities, 1986.
Shearer, Benjamin F. and Marilyn Huxford (Compilers). Communications and Society: A Bibliography on Communications Technologies and Their Social Impact. Westport, Conn.: Greenwood Press, 1983.

Zureik, Elia and Dianne Hartling. The Social Context of the New Information and Communication Technologies: A Bibliography, New York: Peter Lang, 1988.


[^0]:    ${ }^{1}$ For more details about the data and about the logistic regression see (30).

