Migration in a flattening world

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Abstract

The interstate migration rate in the United States has been declining steadily for at least 15 years. We bring together theory and data to explore the sources and implications of this decline. We show that a wide range of long-term demographic changes — including shifts in the age structure, education levels, and female labor force participation — account for essentially *none* of the decrease. Rather, the decrease in migration affects all parts of the population, though it is concentrated among the young and highly educated. These findings rule out many popular theories of the decrease in migration. However, the empirical results fit well with a simple search model in which migration rates change because the world is becoming "flatter," in the sense that the variance in amenities across locations is becoming smaller. If job search is undirected, migration rates rise as the world flattens, because people are closer to being indifferent about where they live and smaller differences in wage offers are needed to justify moving. However, if search is directed, migration rates fall as the world flattens, because people are closer to being indifferent about where they live and hence will not direct their search toward distant locations.

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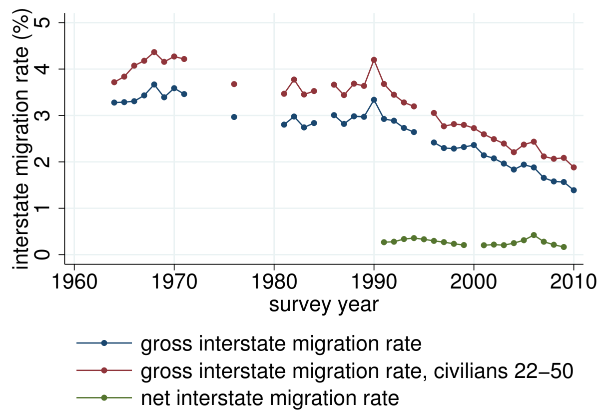


Figure 1: Interstate migration rates.

Gross interstate migration rate is weighted percentage of Current Population Survey respondents who lived in a different state one year earlier. Starting in 1996, calculation excludes respondents with imputed migration data. Net interstate migration rate is one half of the sum across states of the absolute value of net migration, divided by the U.S. population. Source: Authors' calculations from CPS and Census Bureau state population estimates data.

1 Introduction

American workers' high migration rates are often viewed as a defining characteristic of the U.S. labor market, but migration has been declining for at least the past 15 years and possibly much longer (Kaplan and Schulhofer-Wohl, 2010; Molloy, Smith, and Wozniak, forthcoming). Figure 1 shows the annual gross interstate migration rate, as measured by the percentage of Current Population Survey (CPS) respondents who lived in a different state one year earlier.[1] The migration rate has fallen from about 2.4 percent in 1996 to about 1.4 percent in 2010. In this paper, we ask why the migration rate is falling so dramatically. We show that a wide range of long-term demographic and economic changes cannot explain the decrease, and we propose a simple model of job search and local amenities that can.

Figure 1 shows two important patterns that guide our search for a theory. First, the pattern in migration rates among working-age civilians is virtually identical to that among

[1] Following Kaplan and Schulhofer-Wohl (2010), starting in 1996 we exclude respondents with imputed migration data because the imputation procedures generated many spurious interstate moves in some years.

all Americans. Thus, a successful theory must explain changes in the migration rates of working-age people. In the rest of the analysis, we focus on workers (and potential workers) and abstract from considerations such as the choice of where to go to college or retire by restricting our analysis to people ages 22 to 50. Second, gross flows between states are an order of magnitude larger than net flows, which we calculate from the Census Bureau's estimates of net domestic migration.[2] Thus, a successful theory must incorporate a great deal of heterogeneity: It must be optimal for some workers to move from New York to California at the same time that others are moving from California to New York. In our model, we will abstract entirely from net flows by assuming that wage offer distributions are the same everywhere; only individual-specific shocks cause workers to move.

In section 2, we use the data to rule out a number of common ideas about why migration is falling. We show that:

- Population aging cannot explain the decrease in migration, even though older people are less mobile, because the change in the age distribution is quantitatively small.

- The increasing average education level makes the decline in migration a bigger puzzle, because better-educated people are more mobile.

- The rise in female labor force participation and corresponding increase in the number of two-earner households with potential joint-search problems also does not explain the fall in migration: The decline in migration is just as strong among single-earner married couples.

- The decline in migration is unlikely to reflect convergence to steady state in a popu-

[2]State population estimates, including net domestic migration and other components of change, are available at `http://www.census.gov/popest/states`. We calculate the annual net interstate migration rate as follows. Let Δ_{it} be the number of net domestic migrants into state i in year t. (If Δ_{it} is negative, then state i had net outmigration.) Note that $X_t \equiv \sum_i |\Delta_{it}|/2$ is the minimum number of moves that would have to be prevented for all states to have zero net migrants. We calculate the net interstate migration rate as X_t/P_t, where P_t is the U.S. population in year t.

lation of people who started out at random locations, because the migration rate is declining even among new immigrants.

After describing these empirical results, we turn in section 3 to a parsimonious search model that allows us to understand the factors that affect migration. The key hypothesis of our model is that the world is becoming "flatter" (Friedman, 2005) — that is, amenities and job opportunities are becoming more similar from one place to the next. We model this flattening as a decrease in the variance of shocks to individual preferences for particular locations' amenities. We then ask: When will such a flattening cause migration to decrease? We show that the answer depends crucially on whether job search is undirected or directed. In a flatter world, workers are closer to being indifferent about where they locate, based on amenity values alone. Thus smaller differences in wage offers in distant locations are needed to justify moving; if offers arrive from various locations at random, as with undirected search, then migration increases. However, in a flatter world, workers also are less likely to receive a shock to an alternative location that is big enough to warrant the fixed cost of moving. Hence, if search is directed, workers will be less likely to direct their job searches toward other locations; workers thus become less likely receive job offers from other locations and less likely to migrate. In our view, directed search is the most appropriate assumption because new technologies such as Internet job search sites make it increasingly easy for workers to search for jobs far from home and to choose where they search. This extended abstract lays out the basic idea of the model. In future work, we will estimate the model and analyze whether it can account quantitatively for the fall in migration.

2 Some facts about the decline in migration

In this section, we describe changes in interstate migration rates over time, as a function of age, education, household structure and labor force participation, and immigrant status. We show that essentially all of the decrease in migration is a change in migration rates within demographic groups; composition changes explain very little of the decrease in migration. In the results reported here, we look at demographic characteristics one at a time. However, we have also calculated Blinder-Oaxaca decompositions of the decrease in migration using a large array of characteristics at once, and found that even when we include many characteristics at once, composition changes explain essentially none of the decrease in migration.

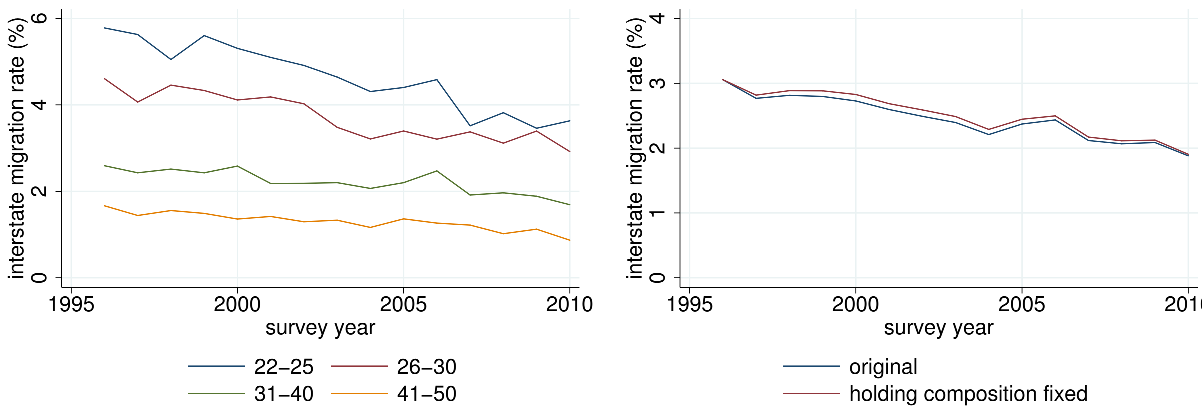
We study data from the 1996 through 2010 Annual Social and Economic Supplements of the Current Population Survey, commonly known as the March CPS. We exclude earlier years because we are we cannot clearly identify respondents with imputed migration data before 1996. We restrict attention to civilian respondents who are ages 22 to 50 and who do not have imputed migration data. Except for the migration imputation flags, we draw all of our variables from the Integrated Public Use Microdata Series, known as IPUMS (King et al., 2010); we link the IPUMS variables to migration imputation flags from the raw CPS data files because IPUMS does not contain all of the variables needed to determine whether a respondent's migration data are imputed.[3]

For each characteristic we examine, we calculate a counterfactual migration rate holding the distribution of that characteristic fixed over time. We calculate this fixed-characteristics migration rate as follows. Suppose the population is partitioned into groups defined by a variable d. Let M be an indicator variable for whether a person migrated. The change in migration rates between year $t-1$ and year t can be written

$$\Delta \mathrm{E}_t(M) = \sum_d \Delta \mathrm{E}_t(M|d) P_{t-1}(d) + \sum_d \mathrm{E}_t(M|d) \Delta P_t(d), \tag{1}$$

where $P_t(d)$ is the fraction of the population in group d in year t. The first term in (1) shows how the migration rate would have changed from $t-1$ to t if each group had remained

[3]See footnote 8 in Kaplan and Schulhofer-Wohl (2010) for details on how we identify respondents with imputed migration data.



(a) Migration rates by age and year.

(b) Counterfactual migration rate holding age distribution (by single year of age) fixed.

Figure 2: Age and migration.

Migration rate is weighted percentage of respondents who lived in a different state one year earlier. Source: Authors' calculations from CPS.

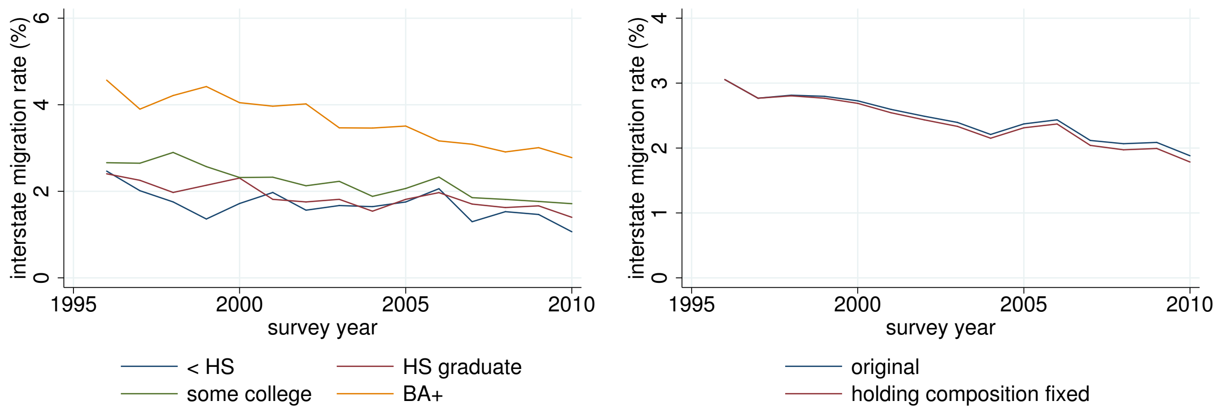
fixed at its year-$t-1$ share of the population; the second term shows the effect of changes in composition. To construct a counterfactual fixed-composition migration rate over a period of many years, we aggregate the first term over time:

$$\mathrm{E}_T^{\mathit{fixed}}(M) = \mathrm{E}_0(M) + \sum_{t=1}^{T} \sum_{d} \Delta \mathrm{E}_t(M|d) P_{t-1}(d). \tag{2}$$

Because the weights on each population group change each year, this procedure is analogous to a chain-weighted price index.

2.1 Age

The U.S. population is aging, and older people move less. Can this change in age structure explain the change in overall migration rates? Figure 2 shows that it cannot. In figure 2(a), we graph migration rates separately for ages 22–25, 26–30, 31–40 and 41–50. Migration is trending downward in all these groups. In figure 2(b), we show the overall migration rate



(a) Migration rates by education and year.

(b) Counterfactual migration rate holding education distribution (by single year of education) fixed.

Figure 3: Education and migration.

Migration rate is weighted percentage of respondents who lived in a different state one year earlier. Source: Authors' calculations from CPS.

as well as a counterfactual migration rate holding the age distribution (by single year of age) constant. The counterfactual fixed-age-distribution migration rate falls only slightly less than the actual rate: Although the population is aging, the change in age structure is not a quantitatively important source of the fall in migration.

2.2 Education

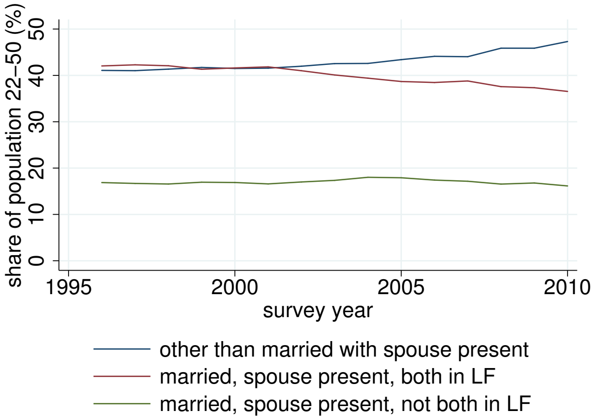
Figure 3 shows that examining changes in education only deepens the mystery. The share of people in our sample with at least a bachelor's degree has risen from 26 percent in 1996 to 31 percent in 2010, with corresponding drops in lower education categories. Yet as figure 3(a) shows, people with more education tend to migrate more. Thus the composition change *raised* the migration rate. Indeed, our decomposition in figure 3(b) shows that the counterfactual migration rate holding the education distribution fixed would have fallen *more* than the actual migration rate.

2.3 Household composition and female labor force participation

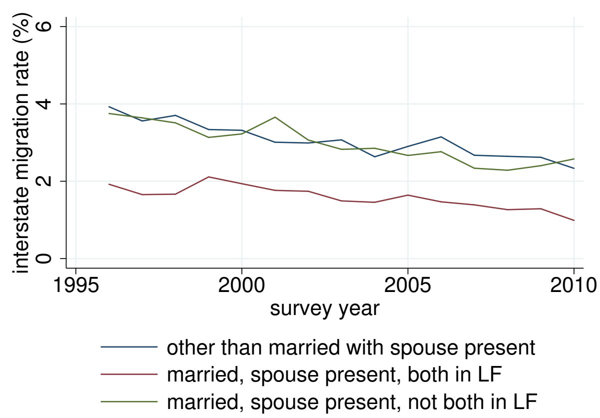
Two-earner couples may migrate less than one-earner couples because a two-earner couple needs to find jobs for both partners in the new location. Has the rise in female labor force participation reduced migration by raising the number of two-earner couples who find it difficult to migrate? Figure 4 rejects this idea. In figure 4(a), we plot the share of the population who are members of a married couple where both spouses are in the labor force; the share who are members of a married couple where one or both spouses are not in the labor force; and the share who are not married with spouse present. It turns out that the share who are members of a two-earner couple has been falling over time. Further, as figure 4(b) shows, migration rates have been trending downward for all household types. As a result, in figure 4(c), the counterfactual migration rate holding household composition fixed is virtually identical to the observed rate. In results not reported here, we find that these results do not change if we use a more detailed categorization of household composition, accounting separately for people who are separated or divorced and people who are cohabiting but unmarried. One caveat to these results is that household composition in the CPS is observed after migration, i.e., we observe migration between $t-1$ and t and household composition at t; thus, these results show the effect of household composition on migration only if household composition does not change when people migrate.

2.4 Immigrant status

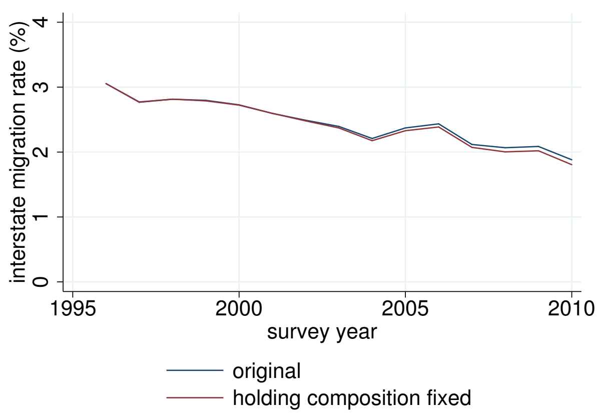
Suppose that people find themselves randomly scattered around the country — perhaps as the result of some large shock such as the Great Depression or World War II — and then gradually migrate to places where they prefer to live and work. The migration rate in such an economy will decline over time as the economy converges to its steady state. Perhaps such convergence explains the falling migration rate. We can examine that hypothesis by looking



(a) Population shares by household type.



(b) Migration rates by household type and year.



(c) Counterfactual migration rate holding composition of household types fixed.

Figure 4: Household composition and migration.

Population share is weighted percentage of respondents who live in a household of the specified type. Migration rate is weighted percentage of respondents who lived in a different state one year earlier. Source: Authors' calculations from CPS.

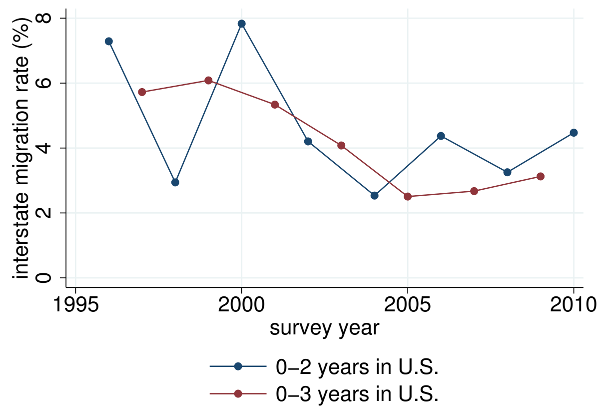


Figure 5: Interstate migration rates among new immigrants.

Migration rate is weighted percentage of respondents who lived in a different state one year earlier. Source: Authors' calculations from CPS.

at people who may still be deciding where in the U.S. they wish to live: recent immigrants. Figure 5 plots the migration rate over time for CPS respondents who moved to the United States within the two or three years preceding the survey. The estimates are noisy because the samples are small (from 315 to 1,345 respondents depending on the year). However, the migration rate appears to be declining over time even for new immigrants. Regression results (available on request) confirm this pattern: In a sample restricted to people in the United States less than 15 years, the migration rate declines after time after controlling for age, education, country of birth and number of years in the United States.

3 A model of migration in a flattening world

Consider a world in which people receive shocks to their relative taste for the different amenities in different locations. If the variance in amenities across locations becomes smaller, migration rates may be affected through two channels:

1. People will be less likely to receive a shock to an alternative location that is big enough to warrant the fixed cost of moving. Hence, they will not direct their labor market

search toward jobs in other locations. They will thus be less likely to get job offers in other locations and less likely to migrate.

2. People will be closer to being indifferent about where they locate themselves, based on amenity values alone. Thus, a smaller wage increase in another location will be needed to justify a move, and migration will increase.

Two features of the environment determine which of these channels dominates:

1. Whether people can direct their search for jobs toward locations that they prefer in terms of amenities, or whether job offers arrive from all locations.

2. Whether the value of living in the home location is also subject to shocks, or whether it is constant. If it is also subject to shocks, then channel 2 may not operate.

In the model that follows, we will consider two alternative assumptions about the nature of search. We will restrict attention to the case where the home location is not subject to shocks, so that shocks can be interpreted as relative to the current location. We will model a flattening of the world as a reduction in the variance of these shocks.

3.1 Model with directed search

There are 2 locations, $j \in \{0, 1\}$; 0 refers to "here" and 1 to "there". There is a distribution of potential wages (jobs) available in each location, $F(w)$. In any period, t, an individual who lives in a location j either works in that location at a wage w_j or is unemployed. In every period, each individual is characterized by a value that he places on the "there" location, v_t, which follows a Markov process. Each period comprises six sub-periods:

1. **(V) Realization of preference shocks.** Individuals start the period in the home location either unemployed or employed. Employed individuals are associated with a

wage, w. The first thing that happens in the current period is that people realize their **next period** utility shocks, v.

2. **(D) Job destruction.** Unlucky employed individuals are fired with probability δ.

3. **(W) Work.** Employed individuals (who were not fired and did not quit) work and receive the wage. Unemployed individuals receive a benefit b.

4. **(S) Job search.** Next, individuals decide whether to search for a new job. They can search either "here" or "there." Searching "here" costs c_0; searching "there" costs c_1. Individuals who search receive an offer to work at the wage w' with probability λ, where w' is drawn from F.

5. **(M) Migration.** The location decision comes next. An individual who decides not to migrate does not pay a moving cost and continues to work at the current wage w. Migration entails a fixed cost κ. We distinguish between two different types of migration:

   (a) <u>Expected Migration (E-migration)</u>: This is migration that takes place when an individual does not already hold an offer to work in the "there" location.

   (b) <u>Directed Migration (D-migration)</u>: This is migration that takes place when an individual moves to a location where he or she already holds an offer to work.

   Once an individual moves, "there" becomes the new "here" location.

The model can be described with the following Bellman equations. The value of an employed individual who has wage w and preference shock v is

$$V^e(w,v) = (1-\delta)\max\{w + \delta Q^e(w,v), b + Q^u(v)\} + \delta[b + Q^u(v)],$$

while the value of an unemployed individual with preference shock v is

$$V^u(v) = b + Q^u(v),$$

where the functions Q^e and Q^u are defined next.

The value that an employed worker with wage w and preference shock v can obtain by searching optimally is

$$\begin{aligned}
Q^e(w,v) \;=\; & \max_{s_0,s_1} s_0 \left[-c_0^e + \lambda \int\limits_{w'} \max\{A(w',v), A(w,v)\}\, dF(\omega) + (1-\lambda) A(w,v) \right] \\
& + s_1 \left[-c_1^e + \lambda \int\limits_{w'} B^e(w,w',v)\, dF(\omega) + (1-\lambda) A(w,v) \right] \\
& + (1 - s_0 - s_1) A(w,v),
\end{aligned}$$

while the value that an unemployed worker with preference shock v can obtain by searching optimally is

$$\begin{aligned}
Q^u(v) \;=\; & \max_{s_0,s_1} s_0 \left[-c_0^u + \lambda \int\limits_{w'} A(w',v)\, dF(\omega) + (1-\lambda) D(v) \right] \\
& + s_1 \left[-c_1 + \lambda \int\limits_{w'} B^u(w',v)\, dF(\omega) + (1-\lambda) D(v) \right] \\
& + (1 - s_0 - s_1) D(v),
\end{aligned}$$

where the functions A, B^e and B^u are defined next.

The value that a person who has preference shock v and received a wage offer w' "here" can obtain by making an optimal migration decision is:

$$A(w',v) = \max\{\beta E_{v'}[V^e(w',v') \mid v], -\kappa + \beta v + \beta E_{v'}[V^u(v') \mid -v]\}.$$

The value that an employed person who has preference shock v, current wage w and wage offer w' "there" can obtain by making an optimal migration decision is:

$$B^e(w, w', v) = \max\left\{\beta E_{v'}\left[V^e(w, v') \mid v\right], -\kappa + \beta v + \beta E_{v'}\left[V^e(w', v') \mid -v\right]\right\}.$$

The value that an unemployed person who has preference shock v and wage offer w' "there" can obtain by making an optimal migration decision is:

$$B^u(w', v) = \max\left\{\beta E_{v'}\left[V^u(v') \mid v\right], -\kappa + \beta v + \beta E_{v'}\left[V^e(w', v') \mid -v\right]\right\}.$$

Finally, the value that an unemployed person with preference shock v who has no wage offer can obtain by making an optimal migration decision is:

$$D^u(v) = \max\left\{\beta E_{v'}\left[V^u(v') \mid v\right], -\kappa + \beta v + \beta E_{v'}\left[V^u(v') \mid -v\right]\right\}$$

3.2 Model with random search

The model is the same except that instead of choosing where to search, the worker receives an offer from the "here" location with probability λ_0 and an offer from the "there" location with probability λ_1. Mathematically, the only change is in the specification of the Q functions.

In particular:

$$\begin{aligned}
Q^e(w,v) &= \max_s s[-c^e + \lambda_0 \int_{w'} \max\{A(w',v), A(w,v)\} dF(\omega) \\
&\quad + \lambda_1 \int_{w'} B(w,w',v) dF(\omega) + (1-\lambda_0-\lambda_1) A(w,v)] \\
&\quad + (1-s) A(w,v) \\
Q^u(v) &= \max_s s[-c^u + \lambda_0 \int_{w'} A(w',v) dF(\omega) \\
&\quad + \lambda_1 \int_{w'} B^u(w',v) dF(\omega) + (1-\lambda_0-\lambda_1) D(v)] \\
&\quad + (1-s) D(v)
\end{aligned}$$

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