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Unintended Migration Consequences of US Welfare Reform

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Abstract: Researchers have analyzed whether US welfare reform has induced interstate migration. Empirical results are inconclusive because methodologies are based on pre-reform thinking. This paper presents a post-reform migration model. We find that recipients move to avoid harsh sanction policies, seek lenient work requirements, and extend time limits. Unlike the first two behavioral responses, the latter is controversial. Critics will argue that such moves are illegal, and violators can be prosecuted because states share data. However, only *active* cases are being shared, meaning violators cannot be caught. Our model produces testable hypotheses which are consistent with (and reconcile) previous empirical results.

I. INTRODUCTION

In 1996, sweeping reforms of the U.S. welfare system were enacted to deal with concerns that Aid for Families with Dependent Children (AFDC) discouraged work, increased dependence,

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and drove up out-of-wedlock fertility. Temporary Assistance for Needy Families (TANF) replaced AFDC. Under TANF, states were charged with developing their own programs. The devolution in welfare policy that ensued (documented extensively in Blank 2002) increased interstate diversity in welfare rules and benefit levels, resulting in substantial variation in the harshness of TANF policies across states. Thus, welfare reform has expanded the potential set of welfare-related migration incentives (De Jong, Graefe, and St. Pierrre 2005).

Empirical studies of welfare migration have focused primarily on benefit differentials between states (e.g., Southwick 1981, Gramlich and Laren 1984, Blank 1988, Enchautegui 1997). Moffit's (1992) review of the AFDC migration literature concluded that benefit differentials had a significant effect on migration, but later studies contradicted this (Walker 1994, Levine and Zimmerman 1999). Results published in Meyer (2000) and McKinnish (2005, 2007) appeared to have reconciled the debate, suggesting that benefit levels have a significant but small effect on migration. However, recently published results in Kennan and Walker (2010) indicate that migration is triggered by differences in state income levels rather than benefits.

Some research has emerged using TANF-era data which examines the migration consequences of work requirements, time limits, and sanctions. Kaestner, Kaushal, and Van Ryzin (2003) found evidence of welfare migration; however, they attributed most of it to enhanced employment opportunities (i.e., differences in minimum wages, unemployment, and/or reliance on service industries) across geographic areas, rather than differences in welfare benefits across states. De Jong, Graefe, and St. Pierrre (2005) also found that states with strictly enforced welfare-to-work policies induced out-migration, but not necessarily to other states with more lenient welfare policies. They also noted that the impact was no different between single mothers and other cohorts receiving welfare benefits. According to Graefe, De Jong, and May (2006) stringent state welfare exemption rules (for participants who are disabled or ill or caring for disabled or ill family members) inhibit in-migration and boost out-migration.

The question that naturally arises is, "Why has the literature failed to form a consensus on welfare migration and its causes, provided it is indeed occurring?" One very general explanation is that the literature is primarily empirical in nature, and does not rely on a reliable theoretical foundation. Many studies (e.g., Brueckner 2000) effectively utilize TANF-era data to test hypotheses and theories derived from AFDC-era rules, which may lead to untenable inferences. Kaestner, Kaushal, and Van Ryzin (2003) posit that time limits decrease migration because time limits lower the present value of benefit differentials. However, this thesis assumes welfare households are forward looking, which has been questioned in De Jong, Graefe, and St. Pierre (2005) and Snarr and Axelsen (2008).

In contrast to Kaestner, Kaushal, and Van Ryzin (2003)'s thesis, Snarr and Burkey (2006) posit just the opposite for recipients living near state borders because moving to the bordering state is inexpensive and extends time limits. "Welfare-flipping", as they called it, is possible only if states do not effectively share data, which was flagged previously by Duncan, Harris, and Boisjoly (1997). Snarr and Burkey's empirical evidence suggests that (after controlling for unemployment rates, socio-economic characteristics, and related factors) some welfare recipients migrate to extend their benefits; however, the incentive diminishes with distance. As such, welfare migration is more likely to occur along state borders (e.g., from Kansas City, KS to Kansas City, MO). Despite its novelty, their (simple) two-period model, unfortunately, did not incorporate decision-making myopia, labor market attachment/detachment, time-related factors that influence the migration decision (including work trigger time limits, lengths of sanction periods, and expected future labor market conditions) and socio-cultural characteristics.

Critics of welfare-flipping may argue it does not occur because it is illegal, and if states were really worried about it, they could simply share data. Currently, all states use the **Public Assistance Reporting Information System (PARIS)** to detect duplicate interstate public assistance payments in programs including (but not limited to) TANF and Supplemental Nutrition Assistance Program (SNAP). PARIS, initiated in 1997, uses social security numbers (SSNs) to generate federal, veteran, and interstate matches. The first two detect overpayments to those failing to declare income and healthcare benefits from all federal sources, while the Interstate Match (IM)—the one of interest in this study—determines if benefits are received in more than one state. According to Bell et al. (2007), states submit cases that are *active* at some point during the month data is submitted. Thus, IM detects double dippers (participants receiving benefits in multiple states simultaneously) but not welfare flippers. To detect the latter, states would need to submit SSNs from closed cases to match with SSNs of current recipients in other states. Even if states were looking, it is unlikely that action would be taken. After all, as Bell et al. (2007) note, follow-up action is weak and varied, with states investigating between 1% and 25% of suspected fraud in the system (with Washington State at the low end and Utah at the other).

Critics might also claim that even if welfare-flipping is occurring, the respective costs are minuscule. Although welfare flipping is not detectable with IM, double dipping is. If it is rampant, as *Table 1* suggests, welfare flipping is potentially problematic as well. According to *Table 1*, as the number of states participating in PARIS tripled from 2000 to 2008, IM *more* than tripled. In 2010, there were just over one million possible double dippers, up 29% from 2009. Ballooning IM potentially equates to billions of dollars in fraudulent payments since the rollout of PARIS. ACF reports that TANF and SNAP double-dippers cost D.C. about one million dollars from 2000 to 2003, while detection saves Pennsylvania nearly $67 million per year.[2]

Table 1: Interstate Matches (IM) for the Month of August

Year	Participants	SSNs submitted	IM	Percent IM
2000	14	9,318,649	55,369	0.59
2001	15	10,326,915	68,572	0.66
2002	18	10,903,263	48,065	0.44
2003	19	12,583,707	66,638	0.53
2004	22	16,907,210	103,110	0.61
2005	21	16,256,076	81,482	0.50
2006	28	20,982,503	129,773	0.62
2007	37	30,446,549	289,052	0.95
2008	42	34,451,178	645,284	1.87
2009	52	44,682,240	814,165	1.82
2010	52	52,747,788	1,047,503	1.99

Source: http://www.acf.hhs.gov/programs/paris/state_info/stateresult.html

2 See http://www.acf.hhs.gov/programs/paris/state_info/succ_par.html (last accessed on July 23, 2010).

According to Snarr (forthcoming), in an era of work requirements, sanctions and time limits, unemployed workers turn first to unemployment insurance (UI) and then enroll in TANF assistance to smooth consumption. This is one potential explanation for the 29% increase in the number of potential double-dippers from 2009 to 2010 (most likely due to very sluggish recovery of the deepest recession in the U.S. since the Great Depression). Migration from high to low unemployment rate states, which has been observed in the latest U.S. Census, does not guarantee low income workers employment. Thus, migrant workers, who were unable to find employment, are likely to enroll in their new states' TANF programs even if they exhausted TANF benefits in other states. In addition, low income migrating workers who land jobs in their new states may augment low wages with TANF benefits even if benefits were previously exhausted. The extension of UI benefits to 99 weeks means low-skilled workers' human capital will depreciate more than had benefits remained at 26 weeks. This will make it even more difficult for the ill-educated to find employment. Thus, double-dipping and welfare-flipping are likely to be even more of a drain on already tight state and federal budgets.

The above discussion raises the question: How can state and federal governments afford to enforce TANF time limits in the very sluggish U.S. recovery? If enforcement is retrospective, as it is with tax evasion, time limit enforcement costs would be relatively high, and the amount of recovered funds would likely be very low. However, if enforcement is prospective, the long term costs (after altering the computer code to allow the extra information to be recorded and stored in the database) would be negligible because program coordinators would simply need to check the database to see that applicants have not exhausted eligibility in other states prior to enrolling individuals in the new state of residence. As such, the costs of prospectively checking the database would likely be offset by identifying a small percentage of individuals who, if allowed to welfare-flip, would receive a relatively large amount of public subsidies over the (new) timeframe of TANF eligibility.

This paper presents a more comprehensive TANF-era economic welfare-migration model, incorporating De Jong, Graefe and St. Pierrre's (2005) primary concerns[3] and the inability of PARIS to detect welfare flipping. Our model accomplishes these tasks by including time-specific, future information that influences current migration decisions. In doing so, our model generates testable hypotheses about which factors matter in making welfare-migration decisions. If multiple factors are found to matter, secondary attention is paid to which factors matter *more* in framing the migration decision.

II. THE MODEL[4]

Consider the decision problem of the head of a typical welfare eligible family, henceforth referred to as "eligible(s)". The eligible (and her/his family) is in her/his final month of eligibility at date

[3] PRWORA altered the migration decision. Work requirements, sanctions for noncompliance, time limits, and benefit reduction rates (tax on welfare recipients' earnings) combined with the earned income tax credit (negative income tax on welfare recipients' earnings) and the freedom states were granted to design TANF programs created significant state heterogeneity in welfare policy with regards to eligibility and behavior-related rules. Hence, De Jong, Graefe and St. Pierre were concerned that welfare-related migration is now motivated by more than just differences in benefit levels.

[4] *Table A1* contains a list of all parameters and variables used in the model.

$i = 0$, and lives distance d from the nearest viable migration destination. If eligibles migrate, m equals one, but equals zero otherwise. Moving allows eligibles to re-enroll in TANF, which resets the clocks to the nearest state's time limit of T months.[5] Lifetime utility is given by

$$U = -\mu dm + \sum_{i=0}^{\infty} \beta^i u(c_i, l_i),$$

where μ is the disutility associated with moving, β is the discount rate, $u = c + \lambda \ln l$, c is the (real dollar value of the) eligible's consumption, l denotes leisure activities, and $\lambda > 0$ represents disattachment from the labor market. While u is admittedly simplistic, it is nonetheless consistent with both the literature and practical considerations of eligibles.[6]

Given that monetary income levels accruing to eligibles are relatively low, we assume that all income is spent in the period it is earned/awarded (Edin and Lein 1997). Income includes earnings (wH or wh) and benefits (G), where H (h) is the number of monthly hours worked off (on) welfare, respectively, and w_i is the (real) hourly wage rate (in many cases a prevailing real minimum wage) at date i. Work undertaken while receiving welfare benefits is subsidized by a combined state and federal earned income credit rate e, which is offset by the state benefit reduction rate b. We assume eligibles receive the earned income credit because they are typically employed in relatively low-paying jobs (Axelsen, Underwood and Friesner 2009; Underwood, Axelsen and Friesner 2010), and let e denote the earned income credit rate. Aggregating this information from date $i = 0$ onwards for eligibles who do not move ($m = 0$) yields lifetime budget constraint:

$$\sum_{i=0}^{\infty} \beta^t c_i = G + (1+\tau) w_0 h + E\left\{\sum_{i=1}^{\infty} \beta^t (1+e) w_i H\right\}, \tag{1}$$

where E denotes expectations at the beginning of the planning horizon, $\tau = e - b$, and h is at least as much as minimum work requirement $\bar{h}$. As an aside, we note in passing that prior to TANF (or under the AFDC policy regime), this budget constraint is

$$\sum_{i=0}^{\infty} \beta^i c_i = G + (1+\tau) w_0 h + E\left\{\sum_{i=1}^{\infty} \beta^i \left[G + (1+\tau) w_i h\right]\right\}. \tag{2}$$

The budget constraint is more complicated when eligibles move. The fixed and variable costs of moving (relative to distance) are denoted F and κd, respectively (Snarr and Burkey 2006). Eligibles are also faced with the new state's work trigger limit[7] (t denotes its length in

5 Restarting TANF clocks is possible because states submit SSNs of active cases to PARIS, and are prohibited from imposing minimum residency requirements (ct. Rosenheim 1970 and Saenz v. Roe, 526 U.S. 489, 1999).

6 Eligibles' marginal utility of consumption is relatively constant according to Edin and Lein (1997) because monetary benefits are sufficiently low to ensure that few discretionary expenditures exist in the typical welfare recipient's budget. On the other hand, the marginal utility of leisure diminishes because recipients support young children, and are required to work or face benefit sanctions. More detailed characteristics of utility functions, including (but not limited to) time-inconsistent preferences, diminishing marginal utility of consumption, or relative risk aversion could be incorporated in u but would be "differenced" out after the decision set is reduced to m. Thus, a more detailed specification of u is unwarranted.

7 Nonexempt recipients are required to participate in work activities *within* 24 months of enrolling in TANF. Variability in the implementation of this policy is substantial. For example, Montana's work trigger is 24 months, California's is 18, South Dakota's is 2, but in Wisconsin it is zero (Gallagher *et al*. 1998, *Table V.5*).

months) and the partial sanction period[8] that follows (x denotes its length in months). Eligibles not complying with the work requirement after month t receive a partial benefit equal to pG until month $t + x$, where $0 < p < 1$. The lifetime budget constraints of movers are

$$\sum_{i=0}^{\infty} \beta^i c_i = G + (1+\tau) w_0 h - F - \kappa d + E\left\{ \sum_{i=1}^{t} \beta^i \left[G^n + (1+\tau^n) w_i^n h \right] + \sum_{i=t+1}^{t+x} \beta^i \left[pG^n + (1+\tau^n) w_i^n h \right] + \sum_{i=t+x+1}^{T} \beta^i \left[G^n + (1+\tau^n) w_i^n h \right] + \sum_{i=T+1}^{\infty} \beta^i (1+e^n) w_i^n H \right\} \quad (3)$$

and

$$\sum_{i=0}^{\infty} \beta^i c_i = G + (1+\tau) w_0 h - F - \kappa d + E\left\{ \sum_{i=1}^{\infty} \beta^i \left[G^n + (1+\tau^n) w_i^n h \right] \right\} \quad (4)$$

respectively. In (3), $h \geq \bar{h}$ at date $i = 0$ and between dates $t + x$ and T, and superscript n differentiates new (destination) state policy from the original state's.

Because the migration decision is made at date $i = 0$, it is based in part on future earnings expectations. Let $\bar{w}$ and $\bar{w}^n$ denote expected future wage rates in the home and destination state's low-skilled labor market, respectively. In addition, eligibles expect to work $\bar{h}$ between dates $i = t + x$ and $i = T$ to avoid the full sanction. Given these expectations, (1) and (3), and (2) and (4) are collapsed into the following equations, respectively:

$$C_{\mathrm{T}}(m) = G + (1+\tau) w_0 \bar{h} - (F + \kappa d) m + (1+e) \bar{w} H \tfrac{\beta}{1-\beta} (1-m) + \left\{ \left[(\beta - \beta^{t+x})(1+\tau^n) h + (\beta^{t+x} - \beta^T)(1+\tau^n) \bar{h}^n + \beta^T (1+e^n) H \right] \bar{w}^n + \left[\beta - \beta^t + (\beta^t - \beta^{t+x}) p + \beta^{t+x} - \beta^T \right] G^n \right\} (1-\beta)^{-1} m, \quad (5)$$

$$C_{\mathrm{A}}(m) = G + (1+\tau) w_0 h - (F + \kappa d) m + [G + (1+\tau) \bar{w} h] \tfrac{\beta}{1-\beta} (1-m) + [G^n + (1+\tau^n) \bar{w}^n h] \tfrac{\beta}{1-\beta} m \quad (6)$$

To simplify the analysis, let us assume there are type-A and B eligibles. Type-B eligibles are more detached from the labor market (i.e., $\lambda_B > \lambda_A$). Given public assistance policies, h and H are assumed to satisfy $0 < h < \bar{h} < H$ and $0 = h < H < \bar{h}$ for A- and B-type eligibles, respectively. This determines leisure levels: $l = L{-}H, L{-}h$, $L - \bar{h}^n$ or $L - \bar{h}$, where L is time split between work and leisure. It also reduces the decision set to m. With j = T for TANF rules or A for AFDC rules, eligibles chose m to solve

$$V_j(m \mid \lambda) = -\mu d m + C_j(m) + \sum_{i=0}^{\infty} \beta^i \lambda \ln l_i \cdot$$

8 PRWORA requires states to reduce TANF payments to families not satisfying work requirements, and gives states considerable flexibility in determining the length and amount of sanctions. For example, first-time offenders living in Alabama lose part of benefit payments until they comply with work requirements, but would have lost all of it in Idaho for no less than one month (Gallagher *et al*. 1998, Table V.3).

III. DEMONSTRATING CONSISTENCY WITH PRIOR WELFARE MIGRATION STUDIES

Having developed our models, we are now in a position to discuss some of the basic migration consequences of TANF, and demonstrate that the findings of our model are consistent with the current literature. Where appropriate, the incentives produced by TANF policies are also compared to those generated under AFDC. The following propositions and corollaries provide these insights. Please refer to the Appendix of the paper for all proofs.

Proposition 1. AFDC-related migration (a) increases in the benefit and earnings *differentials*; (b) decreases in the cost of migrating, attachment to the home state, and distance of the move; and (c) is not influenced by differences in leisure levels across states.

Corollary 1 of Proposition 1. If AFDC participants expect wages to be equal across states, there is no incentive to migrate between states with the same antipoverty measures.

Proposition 2. TANF-related migration (a) increases in the neighboring state's benefit *level* and earnings *differential*; (b) decreases in the cost of migrating, attachment to the home state, and distance of the move; and (c) is influenced by differences in leisure levels across states.

Proposition 1 and its corollary are consistent with the empirical and theoretical results found in the AFDC migration literature. Eligibles are more likely to move to states with more generous benefits (Meyer 2000, Brueckner 2000, McKinnish 2005, 2007) and higher expected earnings (Brueckner 2000, Kennan and Walker 2010), which are functions of work disincentives and labor market expectations. As these differentials become larger, so too does the critical distance. A larger critical distance means a household is close (or sufficiently close) enough to a destination state to make it worthwhile to migrate (Brueckner 2000, Snarr and Burkey 2006, McKinnish 2005). Proposition 1 also suggests that welfare migration is affected by attachment to the home state (Edin and Lein 1997, Schram, Nitz and Krueger 1998, Graefe, De Jong and May 2006).

A comparison of Proposition 2 to Proposition 1 and its corollary demonstrates the dramatic change in migration incentives. First, contrary to Kaestner, Kaushal, and Van Ryzin's (2003) thesis and consistent with Snarr and Burkey (2006), the benefit-related migration incentive is stronger under TANF. This is so because the benefit differential for those who reach the time limit or are fully sanctioned is the difference between getting something if they move or nothing if they don't ($G^n - 0$). Second, the earnings differential between states is a function of sanction policy and work requirements, both of which also create leisure gains (or losses) between states with differing policies.

Both propositions also support much of the empirical literature. For example, both McKinnish (2007) and Snarr and Burkey (2006) find evidence of welfare migration across state lines. Similarly, differences in earnings and economic activities across home and destination states also increase the likelihood of welfare migration; a finding identified by both Kaestner, Kaushal and Van Ryzin (2003) and De Jong, Graefe, and St. Pierrre (2005).

IV. NEW THEORETICAL INSIGHTS TO WELFARE MIGRATION

The primary contribution of our model lies in generating predictions which satisfy the critiques of De Jong, Graefe, and St. Pierrre (2005). That is, can our model predict whether issues such as an eligible's level of myopia, labor force attachment, dynamic considerations and socio-cultural characteristics influence whether or not a typical eligible migrates? The following corollaries to Propositions 1 and 2 address these critiques.[9]

Corollary 2 of Proposition 1. If AFDC participants expect wages to be equal across states, migration into high benefit states is greater among those more attached to the labor market.

Corollary 3 of Proposition 1. If AFDC participants expect wages to be equal across states, migration into high benefit states is greater among forward-looking agents.

Corollary 1.A of Proposition 2. If TANF participants who are more attached to the labor market expect wages to be equal across states, there is a strong incentive to engage in benefit-related migration even if states have chosen the *same* antipoverty measures. Furthermore, benefit-related migration is buoyed by gains in future leisure levels but offset by lost earnings.

Corollary 1.B of Proposition 2. If TANF participants who are relatively more detached from the labor market expect wages to be equal across states, there is a strong incentive to engage in benefit-related migration under TANF even if states have chosen the *same* antipoverty measures. Between dates $i = 1$ and $i = t + x$, the incentive to migrate is buoyed by gains in leisure but offset by lost earnings. The opposite is true between dates $i = t + x$ and $i = T$.

Corollary 2 of Proposition 2. If TANF participants expect wages to be equal across states, the incentive to migrate into high benefit, full sanction states with immediate work requirements is greater for more detached agents.

Corollary 3 of Proposition 2. If TANF participants expect wages to be equal across states, the incentive to migrate into high benefit, full sanction states with immediate work requirements is greater for forward-looking agents.

The preceding corollaries provide a number of new inferences about welfare migration. First, under AFDC, eligibles who are highly detached from the labor market do not engage in employment-related migration. But under TANF, the migration incentive increases in labor market detachment. Taken in tandem, these results imply several interesting inferences about labor market migration. For example, much of the empirical literature has found mixed evidence of welfare migration, and what migration that does exist is empirically explained by differences in labor market characteristics between states. Our finding supports these results, but in a more complex manner than what is suggested by the literature. Welfare recipients who are more attached to the labor market are actually *more* likely to migrate because they are more easily able to work to sustain family income (and, if the nature of the job allows, some level of benefits) while the move takes place, residency is established and TANF benefits are

[9] In this section, high benefit states set $b^n < b$, $e^n > e$ and $G^n > G$.

re-established in the new state. Moreover, even in the case of the more detached eligibles, the incentive depends on *when* and for *how long* the eligibles plan to work and/or *how long* they plan to prolong their benefits. Eligibles with very young children might be expected to have an incentive to stay out of the labor force and migrate in an attempt to prolong benefits until the children are old enough to attend school (i.e., in time period $t + x$). Eligibles with older children face a different labor-leisure tradeoff and decide not to migrate. Related to labor force attachment is the concept of myopia. Our results suggest that myopic agents are less likely to migrate because they attribute much less value to future benefit payments and earnings differentials.

A second consideration is the impact of time; most notably the impact of time limits. Our normalization requiring time to begin at date $i = 0$ does not explicitly incorporate extending the time limit. However, it is straightforward to intuitively incorporate this into our analysis. A one month extension of the time limit obviously prolongs the migration decision by one month. Hence, states that are more apt to approve time limit exemptions should expect much less out-migration. States with long time limits in place should expect more in-migration if earnings gains (losses) are cancelled out by leisure losses (gains).[10] If benefit and earnings effects dominate the leisure effect, states with longer work triggers should experience greater in-migration.[11] States with lenient sanction policies[12] or generous benefit levels and strong work incentives[13] should experience greater in-migration. As with the previous factors, these results inform and/or clarify previous empirical results. Our findings are consistent with De Jong, Graefe, and St. Pierrre's (2005) results associating stringent home state eligibility policies with increased out-migration. Their results do not, however, find that more lenient states attract welfare migrants, which is plausible in our model especially when earnings gains (losses) are *not* cancelled out by leisure losses (gains). Thus, it is the *combination* of policies and earnings opportunities in the destination states that are driving empirical results.

A final consideration is the migration distance eligibles are faced with. Clearly, distance matters, and higher relocation distances reduce the potential for migration. However, one should also keep in mind the definition of the distance term, which in our model is to the nearest *viable* destination state. In Snarr and Burkey (2006), as well as in McKinnish (2007), it was assumed that the definition of a "viable" distance is based on physical location. However, distance may also be based on other considerations, such as sociological and cultural (Axelsen, Underwood and Friesner 2009; Underwood, Axelsen and Friesner 2010). Many rely on a social support structure (a sibling or parent) to help with child care, household duties or emotional support, among other related factors (De Jong, Graefe, and St. Pierrre 2005). If that support network is contained locally, and if the eligible lives near a state border, then welfare flipping is

10 The partial derivative of (A.2) with respect to T is positive if G^n is greater than the absolute value of $(1+\tau^n)(h^n - H)\overline{w}^n + \lambda \ln[(L-h)/(L-H)]$. The left summand is the earnings gain (loss) for type-A (B) agents, while the right summand is the gain (loss) in utility resulting from an increase in leisure for type-B (A) agents.

11 The partial derivative of (A.2) with respect to t is positive if benefit and earnings effects exceed the leisure effect, which is likely for type-A agents especially if the sanction penalty is low ($p \approx 0$). However, the partial derivative is negative if the leisure effect is big enough, which is more likely for type-B agents especially if sanction penalty is steep ($p \approx 1$).

12 The partial derivatives of (A.2) with respect to p and x are unambiguously positive.

13 The signs of the partial derivatives of (A.2) with respect to G^n, e^n, and b^n are clearly +,+, and -, respectively.

entirely reasonable. However, if the social support structures matter in the migration decision, then an alternative support structure may be in a geographically distant state (e.g., Hispanic families split between California and Oregon), or in a state with more stringent eligibility rules. In those cases, it is entirely plausible to expect that no migration occurs because the costs of moving to the alternative location are too high; or that migration, if it occurs, does not result in local migration. Moreover, in the latter case, it is difficult to appropriately generate empirical estimates of welfare migration if the data do not include information on the location of the nearest viable destination state. Race, ethnicity, job opportunities, and neighbors living in adjacent states may simply be insufficient to characterize the complexity of these social networks and related economic institutions.

So, based on the model presented in this paper, is it possible to identify the characteristics of the welfare recipient most likely to practice welfare migration? In a narrow sense, the answer is "yes". Individuals who are forward looking (non-myopic), who have a strong preference for leisure (household production) in the short term, who live near a state border, and have a social support structure in a neighboring state are unambiguously more likely to migrate to prolong welfare benefits. *Table 1* and common sense suggest that this is a small proportion of recipients. In all others, whether eligibles migrate depends on the relative magnitudes of these conflicting incentives. For example, strong local support networks and geographic proximity to state lines will likely create migration if these effects outweigh differences in employment opportunities in the home and destination states, respectively. Alternatively, severely myopic eligibles may not migrate even if limited but positive economic opportunities and social structures in other states are available. Thus, it is not surprising that the empirical literature has produced mixed evidence of welfare migration. The only way to empirically disentangle these incentives is either to collect detailed information on social networks and/or use research designs which profile specific groups of welfare eligible households with an *a priori* propensity to migrate.

V. CONCLUSIONS

Together, our migration models shed much needed light on welfare migration before and after TANF. Our results suggest there are new, different, very powerful incentives for migration. Under AFDC, benefits continued until the eligibles' children reach adulthood. If benefit extensions were desired, eligibles had options in addition to welfare migration; for example, having additional children. Under TANF, eligibles must move to continue receiving benefits after reaching the time limit. Low-income households may also migrate because their head is myopic or forward-looking, detached from or attached to the labor market. As such, our findings are consistent with other counter-examples in the welfare literature, which find that simple explanations posited by naïve economic models are insufficient to comprehensively explain agents' behaviors (Snarr and Axelsen 2008). Our work also has practical implications. For example, given the individual qualities outlined in our propositions, migration decisions are influenced by economic institutions and policy, albeit in a different manner than what was previously hypothesized in the literature. One possible move might be made to avoid harsh sanction policies or tough work requirements. Other factors such as differentials in earnings and state earned income credit programs also contribute to migration decisions, and can be exploited by policy makers to achieve better outcomes.

Another implication of our model for empirical work relates to the techniques used to estimate welfare migration. Ultimately, all decision makers have different degrees of myopia, attachments to the labor force, etc., and face the present ($i = 0$) at different points in time—especially now that more than 10 years have passed since the enactment of TANF. This is especially true if eligibles "bank" welfare benefits. Thus, one of the reasons the literature hasn't come to a consensus empirically is because these migration decisions are being "smeared" or averaged out across participants in given geographic areas. The usual difference-in-differences or regression approaches will likely not capture these effects unless one specifically formulates the empirical model using a theoretical foundation like the one that is laid out in this paper.

It is important to note that our model, while interesting, is not completely exhaustive in its modeling of changes under TANF. It does not incorporate every possible set of socio-cultural economic factors, as doing so would make any attempt to model such decisions unwieldy. Similarly, our model does not explicitly incorporate information on whether and how preferences and constraints evolve over time (for example, as children age and leave the household) (Radzicki 1988). However, this paper represents an important next step because it provides a platform to build testable hypotheses and empirical models. Ultimately, the empirical work that follows will need to rely on micro-level data, a comprehensive set of policy, demographic, and economic variables, and the inclusion of spatial dependencies.

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APPENDIX

Table A1: Table of Symbology

Agent's decision variables	
m	Migration decision = 1 if the agent moves, otherwise = 0
c	Monthly consumption level
h	Hours worked per month on welfare
H	Hours worked per month off welfare
l	Hours of leisure consumed each month
L	Total time available each month for work or leisure
Exogenous policy variables	
T	Length of the neighboring state's time limit
t	Length of the neighboring state's work trigger
h	Minimum hours of work required by the state
x	Length of the neighboring state's partial sanction period
G	Dollar value of monthly cash grant from the government
w	Hourly wage
e	Earned Income Tax Credit rate
b	Benefit reduction rate
τ	Net-tax on earnings ($\tau = e - b$)
p	Percent reduction in *G* after agent reaches work trigger *t*
n	Superscript that identifies the variables of the neighboring state
Exogenous parameters	
μ	Disutility associated with migrating at the end of month one
β	Discount factor
λ	Relative disutility of work
d	Distance of the move ($\hat{d}$ and $\tilde{d}$ denote the distances that makes the agent indifferent between migrating or not, under AFDC and TANF, respectively)
F	Fixed costs of migration
κ	Migration cost of moving each of *d* units

Proof of Proposition 1. The agent moves if her expected lifetime utility is increased by moving across the border to the nearest state:

$$\begin{aligned}\Delta V_{\text{A}}(d) &= V_{\text{A}}(1) - V_{\text{A}}(0)\\ &= -\mu d + C_{\text{A}}(1) - C_{\text{A}}(0) + \sum_{i=0}^{N} \beta^i \lambda \ln(L-h) - \sum_{i=0}^{N} \beta^i \lambda \ln(L-h)\\ &= -\mu d - F - \kappa d + \{G^n - G + [(1+\tau^n)\overline{w}^n - (1+\tau)\overline{w}]h\}\tfrac{\beta}{1-\beta}\\ &> 0,\end{aligned}$$

Solving this for d yields

$$d < \left\{\text{PV}\Delta G + \text{PV}\Delta Y - F\right\}/(\kappa + \mu) \qquad \text{(A.1)}$$

where

$$\text{PV}\Delta G \equiv \tfrac{\beta}{1-\beta}[G^n - G]$$

$$\text{PV}\Delta Y \equiv \tfrac{\beta}{1-\beta}[(1+\tau^n)\overline{w}^n - (1+\tau)\overline{w}]h$$

The agent moves as long as inequality (A.1) holds. If $\hat{d}$ is the "critical" distance that makes the agent indifferent between migrating or not ($\Delta V_{\text{A}}(\hat{d}) = 0$), then

$$\hat{d} = \left\{\text{PV}\Delta G + \text{PV}\Delta Y - F\right\}/(\kappa + \mu) \cdot \qquad \textit{QED}.$$

Proof of Corollary 1 of Proposition 1. Since agents expect wages to be the same across states ($\overline{w}^n = \overline{w}$) and states have similar antipoverty policies ($b^n = b$, $e^n = e$ and $G^n = G$),

$$\text{PV}\Delta Y = \text{PV}\Delta G = 0 \text{ and } \hat{d} = -F/(\kappa + \mu).$$

This means $\Delta V_{\text{A}}(d) < 0 \;\; \forall d > \hat{d}$. *QED.*

Proof of Corollary 2 of Proposition 1. Since $b^n < b$, $e^n > e$ and $\overline{w}^n = \overline{w}$,

$$\text{PV}_i \Delta Y \equiv \tfrac{\beta}{1-\beta}[\tau^n - \tau]\overline{w}h,$$

where subscript i denotes type of agent (A for type-A, B for type-B). For type-B agents, the present value earnings differential above is equal to zero ($h = 0$), but positive for type-A agents ($h > 0$). By assumption, $G^n > G$. This means the present value benefit differential is positive:

$$\text{PV}\Delta G \equiv \tfrac{\beta}{1-\beta}[G^n - G] > 0.$$

Since

$$\text{PV}\Delta G + \text{PV}_{\text{A}}\Delta Y > \text{PV}\Delta G,$$

$$\hat{d}_{\text{A}} > \hat{d}_{\text{B}}. \textit{ QED.}$$

Proof of Corollary 3 of Proposition 1. If β_f and β_m represent the discount factors of forward-looking and myopic agents, then $\beta_f > \beta_m$ or

$$\tfrac{1}{1-\beta_f} > \tfrac{1}{1-\beta_m} ,$$

or

$$\tfrac{\beta_f}{1-\beta_f} > \tfrac{\beta_m}{1-\beta_m}$$

Since

$$b^n < b \, , \; e^n > e \, , \; G^n > G \;\text{ and }\; \bar{w}^n = \bar{w} \, ,$$

$$\text{PV}_i \Delta Y \equiv \tfrac{\beta_i}{1-\beta_i}[\tau^n - \tau]\bar{w}h > 0 \;\text{ and }\; \text{PV}_i \Delta G \equiv \tfrac{\beta_i}{1-\beta_i}[G^n - G] > 0 \, .$$

Therefore,

$$\text{PV}_f \Delta Y > \text{PV}_m \Delta Y \;\text{ and }\; \text{PV}_f \Delta G > \text{PV}_m \Delta G \, ,$$

which means, under the assumed conditions, forward looking agents are more likely to migrate under AFDC than myopic agents. *QED*.

Proof of Proposition 2. The agent moves to the nearest state if

$$\begin{aligned}
\Delta V_{\text{T}}(d) &= V_{\text{T}}(1) - V_{\text{T}}(0) \\
&= -\mu d + C_j(1) - C_j(0) + \tfrac{\beta-\beta^{t+x}}{1-\beta}\lambda \ln\left(\tfrac{L-h}{L-H}\right) + \tfrac{\beta^{t+x}-\beta^{T}}{1-\beta}\lambda \ln\left(\tfrac{L-\bar{h}}{L-H}\right) \\
&= -\mu d - F - \kappa d - (1+e)\bar{w}H\tfrac{\beta}{1-\beta} \\
&\quad + \Big\{ [(\beta-\beta^{t+x})(1+\tau^n)h + (\beta^{t+x}-\beta^T)(1+\tau^n)\bar{h}^n + \beta^T(1+e^n)H]\bar{w}^n \\
&\qquad + [\beta - \beta^t + (\beta^t - \beta^{t+x})p + \beta^{t+x} - \beta^T]G^n \Big\}(1-\beta)^{-1} \\
&\quad + \tfrac{\beta-\beta^{t+x}}{1-\beta}\lambda \ln\left(\tfrac{L-h}{L-H}\right) + \tfrac{\beta^{t+x}-\beta^{T}}{1-\beta}\lambda \ln\left(\tfrac{L-\bar{h}}{L-H}\right) \\
&> 0.
\end{aligned}$$

Solving for d yields

$$d < \Big\{ \text{PV}G^n + \text{PV}\Delta Y - F + \Lambda \Big\} / (\kappa + \mu) \tag{A.2}$$

where

$$\text{PV}G^n = \tfrac{\beta-\beta^T-(\beta^t-\beta^{t+x})(1-p)}{1-\beta} G^n > 0 \, ,$$

$$\text{PV}\Delta Y \equiv \text{PV}\Delta Y_1^{t+x} + \text{PV}\Delta Y_{t+x}^{T} + \text{PV}\Delta Y_T^{\infty} \, ,$$

$$\Lambda \equiv \Lambda_1^{t+x} + \Lambda_{t+x}^{T} \, ,$$

$$\text{PV}\Delta Y_1^{t+x} \equiv \tfrac{\beta-\beta^{t+x}}{1-\beta}[(1+\tau^n)\bar{w}^n h - (1+e)\bar{w}H] \, ,$$

$$\text{PV}\Delta Y_{t+x}^{T} \equiv \tfrac{\beta^{t+x}-\beta^{T}}{1-\beta}[(1+\tau^{n})\overline{w}^{n}\overline{h}^{n} - (1+e)\overline{w}H],$$

$$\text{PV}\Delta Y_{T}^{\infty} \equiv \tfrac{\beta^{T}}{1-\beta}[(1+e^{n})\overline{w}^{n} - (1+e)\overline{w}]H,$$

$$\Lambda_{1}^{t+x} \equiv \tfrac{\beta-\beta^{t+x}}{1-\beta}\lambda \ln\left(\tfrac{L-h}{L-H}\right),$$

$$\Lambda_{t+x}^{T} \equiv \tfrac{\beta^{t+x}-\beta^{T}}{1-\beta}\lambda \ln\left(\tfrac{L-\overline{h}}{L-H}\right).$$

The agent moves as long as inequality (A.2) holds. If $\tilde{d}$ is the distance that makes the agent indifferent between migrating or not ($\Delta V_j(\tilde{d}) = 0$), then

$$\tilde{d} = \left\{\text{PV}\Delta G + \text{PV}\Delta Y - F + \Lambda\right\}/(\kappa + \mu).$$

Proof of Corollary 1.A of Proposition 2. Assume that agents expect wages to be equal across states ($\overline{w}^{n} = \overline{w}$) and states have exactly the same antipoverty measures, $b^{n} = b$, $e^{n} = e$ and $G^{n} = G$. Thus, agents have a strong incentive to engage in benefit-related migration in their final month of TANF eligibility because

$$\text{PV}G^{n} = \tfrac{\beta-\beta^{T}-(\beta^{t}-\beta^{t+x})(1-p)}{1-\beta}G^{n} > 0.$$

Let h_i and H_i denote the hours worked on and off welfare by a j type agent, respectively, and let λ_j denote the agent's relative disutility for work. Because type-A agents work more if they remain living in their home states ($H_A > h_A$ and $H_A > \overline{h}$), we have

$$\text{PV}\Delta Y_{1}^{t+x} = -\tfrac{\beta-\beta^{t+x}}{1-\beta}[(1+e)(H_A - h_A) + bh_A]\overline{w} < 0$$

and

$$\text{PV}\Delta Y_{t+x}^{T} = -\tfrac{\beta^{t+x}-\beta^{T}}{1-\beta}[(1+e)(H_A - \overline{h}) + b\overline{h}]\overline{w} < 0$$

which counter benefit-related migration. However, working more in their home states means the type-A agents work less in their new states. Thus

$$\text{PV}\Delta Y_{1}^{t+x} = -\tfrac{\beta-\beta^{t+x}}{1-\beta}[(1+e)(H_A - h_A) + bh_A]\overline{w} < 0,$$

and

$$\text{PV}\Delta Y_{t+x}^{T} = -\tfrac{\beta^{t+x}-\beta^{T}}{1-\beta}[(1+e)(H_A - \overline{h}) + b\overline{h}]\overline{w} < 0$$

buoy benefit-related migration. *QED*.

Proof of Corollary 1.B of Proposition 2. Welfare recipients of either type are faced with the same present value benefit differential:

$$\text{PV}G^{n} = \tfrac{\beta-\beta^{T}-(\beta^{t}-\beta^{t+x})(1-p)}{1-\beta}G^{n} > 0.$$

For type-B agents, $h_B = 0$ and $H_B < \bar{h}$. Therefore,

$$PV\Delta Y_1^{t+x} = -\tfrac{\beta-\beta^{t+x}}{1-\beta}(1+e)H_B\bar{w} < 0\,,$$

$$PV_B\Delta Y_{t+x}^T = \tfrac{\beta^{t+x}-\beta^T}{1-\beta}[(1+e)(\bar{h}-H_B)-b\bar{h}]\bar{w}\,,$$

$$\Lambda_1^{t+x} \equiv \tfrac{\beta-\beta^{t+x}}{1-\beta}\lambda_B \ln\left(\tfrac{L}{L-H_B}\right) > 0\,,$$

$$\Lambda_{t+x}^T \equiv \tfrac{\beta^{t+x}-\beta^T}{1-\beta}\lambda_B \ln\left(\tfrac{L-\bar{h}}{L-H_B}\right) < 0\cdot$$

$PV_B\Delta Y_{t+x}^T$ is positive if $\eta < b/(1+e)$, where $\eta \equiv 1 - H_B/\bar{h}$. Since the benefit reduction rate (b) typically ranges from 33 to 100 percent and the "phase-in" EITC rate (e) equal to 40 percent, $b/(1+e)$ ranges from 24 to 71 percent. If states set work requirements so that welfare recipients most detached from the labor market work about as much as they would off welfare, then $\bar{h}$ would be set such that $H_B/\bar{h}$ might range from 80 to 100 percent. Under these scenarios, η ranges from 0 to 20 percent, and so $PV_B\Delta Y_{t+x}^T$ is positive *QED*.

Proof of Corollary 2 of Proposition 2. An immediate work requirement and full sanction means the agent must work $\bar{h}^n$ at date i = 1 (the first month of residence) to collect G and $p = 0$. Since $b^n < b$, $e^n > e$ and $\bar{w}^n = \bar{w}$, the critical distance in this scenario simplifies to

$$\tilde{d}_j = \left\{PV_j G^n + PV_j\Delta Y_1^T + PV_j\Delta Y_T^\infty - F + \Lambda_j\right\}/(\kappa + \mu)$$

where

$$PV_j G^n = \tfrac{\beta-\beta^T}{1-\beta}G^n\,,$$

$$PV_j\Delta Y_1^T \equiv \tfrac{\beta-\beta^T}{1-\beta}[(1+\tau^n)\bar{h}^n - (1+e)H_j]\bar{w}\,,$$

$$PV_j\Delta Y_T^\infty \equiv \tfrac{\beta^T}{1-\beta}(e^n - e)H_j\bar{w}\,,$$

$$\Lambda_j \equiv \tfrac{\beta-\beta^T}{1-\beta}\lambda \ln\left(\tfrac{L-\bar{h}}{L-H_j}\right),$$

and subscript i denotes type of agent. First, notice that $PV_j G^n$ is the same for either type of agent. Suppose, by way of contradiction, that the following is not true:

$$PV_A\Delta Y_1^T < PV_B\Delta Y_1^T\,. \qquad \text{(A.3)}$$

Then $PV_A\Delta Y_1^T \geq PV_B\Delta Y_1^T$ simplifies to

$$[(1+\tau^n)\bar{h}^n - (1+e)H_A]\bar{w} \geq [(1+\tau^n)\bar{h}^n - (1+e)H_B]\bar{w}\,,$$

or $H_A \leq H_B$, which is a contradiction. Thus, inequality (A.3) holds. Since $H_A > \bar{h} > H_B$,

$$\ln\left(\tfrac{L-\bar{h}}{L-H_{\mathrm{B}}}\right) < 0 < \ln\left(\tfrac{L-\bar{h}}{L-H_{\mathrm{A}}}\right) \tag{A.4}$$

and

$$\mathrm{PV}_{\mathrm{A}}\Delta Y_T^{\infty} > \mathrm{PV}_{\mathrm{B}}\Delta Y_T^{\infty}\,. \tag{A.5}$$

From inequality (A.4) we get $\Lambda_{\mathrm{A}} > \Lambda_{\mathrm{B}}$. Between dates $i = 1$ and $i = T$, inequality (A.4) suggests type-A agents have a larger leisure-related migration effects than type-B agents, while on the other hand inequality (A.3) suggests type-B agents have a larger earnings-related migration effect than type-A agents. Because inequality (A.5) occurs many periods into the future, equally forward looking agents of type A or B do not give this effect as much weight as the effects given in (A.3) and (A.4) when making the decision to move at date $i = 0$. Thus, $\tilde{d}_{\mathrm{B}}$ is larger than $\tilde{d}_{\mathrm{A}}$ if

$$\mathrm{PV}_{\mathrm{B}}\Delta Y_1^T - \mathrm{PV}_{\mathrm{A}}\Delta Y_1^T > \tfrac{\beta-\beta^T}{1-\beta}\ln\left[\left(\tfrac{L-\bar{h}}{L-H_{\mathrm{A}}}\right)^{\lambda_{\mathrm{A}}}\left(\tfrac{L-H_{\mathrm{B}}}{L-\bar{h}}\right)^{\lambda_{\mathrm{B}}}\right],$$

or

$$H_{\mathrm{A}} > H_{\mathrm{B}} + \tfrac{1}{(1+e)\bar{w}}\ln\left[\left(\tfrac{L-\bar{h}}{L-H_{\mathrm{A}}}\right)^{\lambda_{\mathrm{A}}}\left(\tfrac{L-H_{\mathrm{B}}}{L-\bar{h}}\right)^{\lambda_{\mathrm{B}}}\right] \tag{A.6}$$

Inequality (A.6) says that when type-A agents work much more off welfare than type-B agents the earnings-related migration effect relative to that of leisure is much smaller for them than it is for type-B agents. *QED*.

Proof of Corollary 3 of Proposition 2. An immediate work requirement and full sanction means the agent must work $\bar{h}^n$ at date $i = 1$ (the first month of residence) to collect G and $p = 0$. If β_f and β_m denote the discount factors of forward-looking and myopic agents, then $\beta_f > \beta_m$. Since $b^n < b$, $e^n > e$ and $\bar{w}^n = \bar{w}$, the critical distance in this scenario simplifies to

$$\tilde{d}_j = \left\{\mathrm{PV}_j G^n + \mathrm{PV}_j\Delta Y_1^T + \mathrm{PV}_j\Delta Y_T^{\infty} - F + \Lambda_j\right\}/(\kappa+\mu)$$

where

$$\mathrm{PV}_j G^n = \tfrac{\beta_j-\beta_j^T}{1-\beta_j}G^n\,,$$

$$\mathrm{PV}_j\Delta Y_1^T \equiv \tfrac{\beta_j-\beta_j^T}{1-\beta_j}[(1+\tau^n)\bar{h}^n - (1+e)H]\bar{w}\,,$$

$$\mathrm{PV}_j\Delta Y_T^{\infty} \equiv \tfrac{\beta_j^T}{1-\beta_j}(e^n-e)H\bar{w}\,,$$

$$\Lambda_j \equiv \tfrac{\beta_j-\beta_j^T}{1-\beta_j}\lambda\ln\left(\tfrac{L-\bar{h}}{L-H}\right).$$

Since $\beta_f > \beta_m$ implies $\beta_f^T > \beta_m^T$, which implies

$$\beta_f^T/(1-\beta_f) > 1/(1-\beta_f) > 1/(1-\beta_m) > \beta_m^T/(1-\beta_m)\,,$$

$$\mathrm{PV_A}\Delta Y_T^{\infty} > \mathrm{PV_B}\Delta Y_T^{\infty}. \qquad (A.7)$$

Next, we must show

$$\frac{\beta_f - \beta_f^T}{1-\beta_f} > \frac{\beta_m - \beta_m^T}{1-\beta_m}.$$

Define $g(\beta,T) \equiv (\beta - \beta^T)/(1-\beta)$ .By the Mean Value Theorem,

$[g(\beta_f,T) - g(\beta_m,T)]/[\beta_f - \beta_m]$ is bounded by $\partial g(\beta_m,T)/\partial\beta$ and $\partial g(\beta_f,T)/\partial\beta$ for some given T since $\beta_f > \beta_m$. For all T and β,

$$\frac{\partial g(\beta,T)}{\partial\beta} = \frac{(1-T\beta^{T-1})(1-\beta)+\beta-\beta^T}{(1-\beta)^2} > 0\cdot$$

Therefore, for all agents

$$\mathrm{PV}_f G^n > \mathrm{PV}_m G^n, \qquad (A.8)$$

For type-A agents,

$$\mathrm{PV}_f \Delta Y_1^T < \mathrm{PV}_m \Delta Y_1^T < 0 < \Lambda_m < \Lambda_f \qquad (A.9)$$

if $(1+e^n)\bar{h}^n \approx (1+e)H_\mathrm{A}$. Since $G^n > \bar{h}^n\bar{w} > b^n\bar{h}^n\bar{w}$, the benefit level effect dominates the earnings differential effect in (A.9), and since all other effects were positive for type-A agents $\tilde{d}_f > \tilde{d}_m$. For type-B agents, we have

$$\Lambda_f < \Lambda_m < 0 < \mathrm{PV}_m \Delta Y_1^T < \mathrm{PV}_f \Delta Y_1^T \qquad (A.10)$$

if $b^n > 1+e^n-(1+e)H_\mathrm{B}/\bar{h}^n$. (If $e^n = 0.45$, $e = 0.40$ and the type-B agent works about the same number of hours off welfare that she is required to on welfare ($\bar{h}^n = 20$, H = 17 to 19 hours), then b^n would have to be set larger than at least 0.26.) If the leisure differential effect in (A.10) is countered by the earnings differential effects in (A.7) and (A.10) and the benefit level effect in (A.8) $\tilde{d}_f > \tilde{d}_m$ for type-B agents. *QED*.