Welfare Spending in the Long Run

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PRELIMINARY

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Abstract

In this paper,we construct an equilibrium search model of the labor market augmented to include lump sum taxes that finance government expenditures. Using the model, we can decompose the decline in labor force participation (LFP) into the policy effect and that of other factors such as declining economic output. Using census data for the state of Ohio, we learn that declining LFP and the increase in public assistance spending were caused by weaker economic output that led to an increase in the claimant count. Our results indicate that if the economy resembled the pre-crisis period, the Kasich administration would have led to an increase in LFP of approximately 0.6 percentage points. This effect goes up to 2% if all inactive workers are assumed to claim welfare income.

1 Introduction

Governor John Kasich spent nearly two decades in Congress before winning election as Ohio Governor for the first time in 2010. He won re-election by an overwhelming 30 points in 2014. By September 2015, the unemployment rate in Ohio was down to 4.5%, according to data compiled by the Federal Reserve, a significant improvement from near 9.0% when John Kasich took office in 2011 and Ohio's joblessness and the national rate were tied. How much of this improvement can be credited to the Governor John Kasich and his administration?

Since 2005 *(before the Great-recession)*, labor force participation has been on a decline both in Ohio and in the rest of the nation. During the same period, in the state of Ohio, the share of General Revenue Fund (GRF) disbursements that went to Public Assistance and Medicaid has increased. The GRF only represents just under half of the money the state spends. It represents those funds which are most flexible, in most cases not designated for a specific purpose, and so the state has more discretion over the allocation of these funds. On one hand, Governor Kasich cut taxes. On the other hand, despite an overall decrease in spending, transfers to households in the form of public assistance which already dominated GRF expenditures, have been on the rise. The 2014 figure represents a 13.82% increase compared to 2007 under the last conservative governor. GRF disbursement tables for 2007, 2011, 2012 and 2014 are included in the appendix.

In this article, we compare labor market outcomes before and after governor John Kasich. Using an equilibrium search model of the labor market, we estimate the value of labor force participation (LFP) for Ohio before *(under governor Taft)* and after *governor Kasich*. In addition, we investigate whether the spending increase on public assistance to households was caused by changes in the government attitude toward financing welfare payments (policy effect) or by other factors such as a weaker economy. Using the model, we can decompose labor force participation into the policy effect and that of other factors such as a declining economic output. In other words: did the value of employment income decrease relative to welfare income due to the economic climate or because of government policy? We then provide a discussion about the labor market effects of welfare spending in the long run.

Existing studies regarding the effect of fiscal policy on labor market outcomes are worth mentioning. Ravn and Simonelli (2007) find that expansionary fiscal policy stimulates employment and lowers unemployment. Bruckner and Pappa (2011) provide evidence that unemployment rates can also increase as a result of a fiscal expansion due to increased labor force participation. To reconcile theory with evidence, they add the participation margin in a New Keynesian model with labor market frictions as in Ravn (2008). In their framework, due to sticky prices, the increase in government spending generates a labor demand effect and so more workers enter the market since in times of high labor demand, their probability of finding a job increases. Their result relies on the following key assumptions: (1) price stickiness in the short run causes real wages to increase

when government expenditures causes an increase in aggregate demand which in turn causes labor demand to increase (2) All workers who are not employed *(insiders and outsiders)* whether participating or not, collect unemployment benefits in their framework which is also key to generating increases in labor force participation.

A long list of literature has highlighted the postive effects of welfare reform on labor force participation. Lubotsky (2004) provides empirical evidence that the 1991 elimination of the General Assistance program in Michigan contributed to a 2-4% increase in LFP among high school dropouts *(low skilled workers)*. For a complete review of this literature, see Bartik (2000).

The main challenge in measuring the effect of a fiscal expansion is caused by the fact that although government expenditures affect economic variables which in turn also affect fiscal policy and the size of government transfers to households. A fiscal expansion is often the endogenous outcome of a decrease in economic activity that leads to an increase in the claimant count. With these issues in mind, we construct a dynamic equilibrium search model of the labor market augmented to include the labor force participation decision and government budgeting. We impose a balanced government budget such that any increase in government spending must be fully funded by lump sum taxes on labor income. In our model, we distinguish between job seekers allowance *(unemployment benefits)* which incentivizes labor force participation and welfare transfers to inactive households that reward the "welfare scrounge".

In our model, an increase in the value of welfare provision leads to a decline

in labor force participation (LFP) since less unemployment compensation implies lower job search subsidies. On the positive side, when the labor market becomes less congested, the job finding rate increases and the unemployment rate falls. The problem arises from the fact that since LFP declined, even though workers find jobs at a faster rate, fewer workers are actually in employment. This decrease in the stock of employed workers causes tax revenues to decrease and so the unemployment benefit falls, reducing the job search incentive further. This negative effect on job search incentives is exacerbated by poor economic conditions *i.e. a decline in output*. It is in fact well documented that higher unemployment insurance subsidizes job search thus causing both higher participation incentives despite longer spells of unemployment (see the search theoretic literature on unemployment insurance). On the firm side, jobs are created so long as the surplus is non-negative. This implies that decrease in the surplus leads to a decrease in the number of new vacancies.

State welfare transfers discourage labor force participation of less able workers. High ability individuals enter the labor market, and are also more likely to find a job. The outcome of this policy is an economy plagued with higher inequality since the concentration of welfare gains go to a fewer number of highly able employed individuals, while the larger inactive population is left equally sharing the collected tax revenue. A recession exacerbates the negative effects of welfare spending since total government revenues fall during a recession for two reasons: (1) the government is not allowed to borrow in our framework and (2) an increase in taxes causes the surplus to decrease. As a result, fewer

vacancies are created, the job finding rate decreases leading to a higher jobless rate at lower levels of welfare income.

Our results indicate that if economic conditions resembled the pre-crisis period, the change in administration would have led to an increase in labor force participation of approximately 0.6 percentage points. On the other hand, the unemployment rate would have also increased by 0.04 percent. When we assume that all inactive workers collect welfare payments, the policy change leads to a 2% increase in LFP. Our quantitative analysis reveals that Governor John Kasich policies caused the value of welfare income to decrease and so the observed increase in public assistance spending is due mostly to economic conditions outside of the administration's control, that led to an increase in the claimant count. It is not all bad news for Ohio since the governor's good judgment led cuts in distortionary income taxes. It is the first move in the right direction. Productivity growth is low and so rising living standards will depend on getting the economy back on track in terms of higher rates of new business startups. Steps in the right direction would include less intervention, less regulation and lastly even fewer transfers to inactive households in order to promote the right incentives.

In the next section, we present stylized facts about the Ohio economy and the rest of the US states which will be used for our quantitative analysis. In section 3, we introduce our model. In section 4, we present our quantitative analysis and a discussion of the results. Section 5 concludes.

2 Stylized Facts

For our analysis, we use IPUMS USA complete samples for 2007 and 2014. We restrict our analysis to men (heads of household) in the working age population (age 25-54). We do so to avoid picking up the effect of gender differences, fertility and marriage market implications for labor force participation.

Unemployment rates followed the rest of the nation during the recession, however since 2010, the unemployment rate has declined faster in Ohio than in the rest of the nation, returning to pre-crisis levels. Labor force participation has been on a steady decline both in Ohio and the rest of the nation even when compared to pre-crisis levels. The following figures illustrate the unemployment rate.

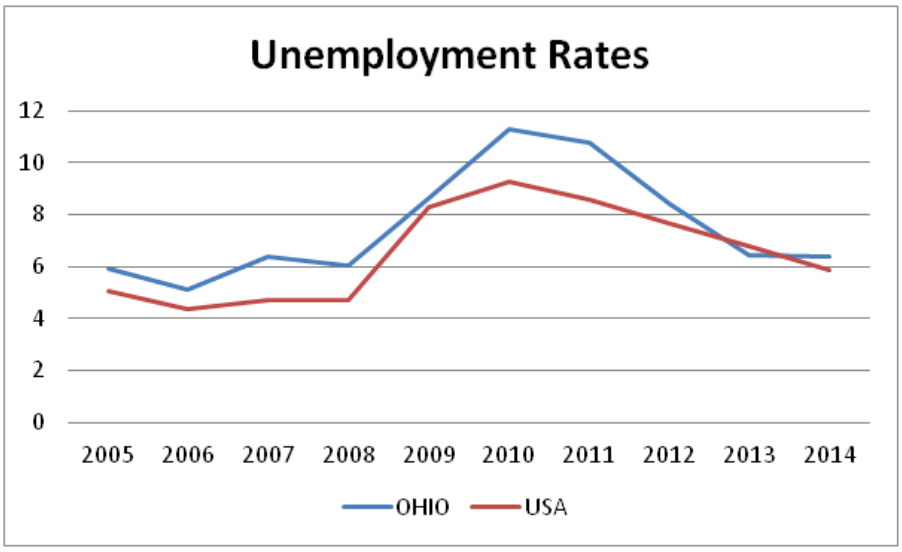

Fig. 1: Unemployment: working age 25-54

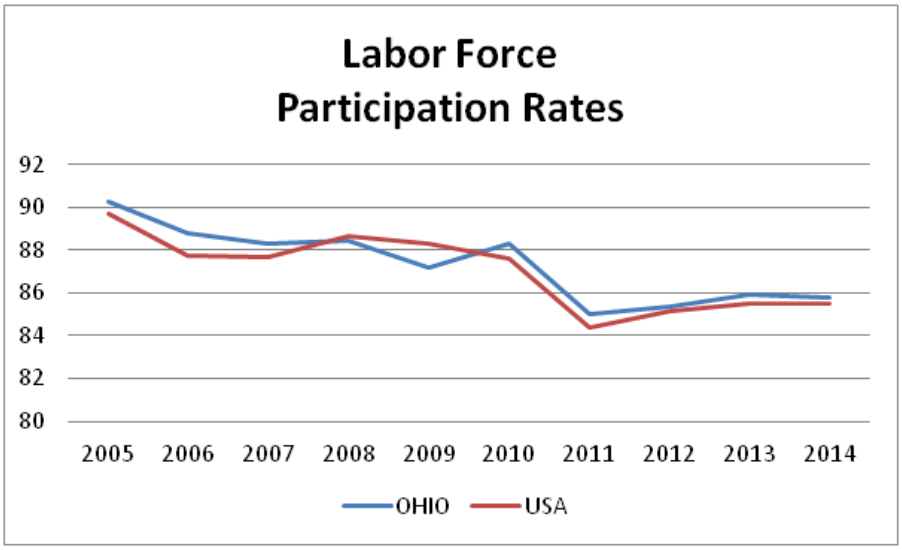

Fig. 2: LFP rates: working age population (age 25-54)

In table 1 and 2, we compare cross-sections before and after the crisis. Labor force participation was 2.2 % higher in 2007 compared to 2014. Although nominal wages remained constant, real wages were lower in 2014.

Table 1: Ohio **Labor Market**	**2007**	**2014**
LFP rate	0.882	0.860
Unemployment rate	0.058	0.061
Real mean hourly wage	20.89	17.21
Job Separation rate	0.017	0.015
Un. reporting welfare income	0.035	0.048
Inactive reporting welfare income	0.0460	0.056
Un. Benefit / Market wages	0.0424	0.0550
Welfare / Market wages	0.0440	0.0392

Table 2: The rest of US States	**2007**	**2014**
LFP rate	0.876	0.854
Unemployment rate	0.046	0.058
Un. reporting welfare income	0.032	0.051
Inactive reporting welfare income	0.030	0.037

3 The Model

Time is discrete. The economy is populated with homogeneous agents of mass N^s workers. All agents live $T \geq 2$ periods and discount the future at rate $\beta = \widetilde{\beta}(1 - \Omega)$, where Ω is the rate at which agents exit the economy and retire. They can stay out of the market, they can enter the market and become employed or end up unemployed. The superscript $s \in \{n, e, u\}$denotes the state of workers for not participating, employed or unemployed respectively.

The surplus is defined as $x - R - k$, where x is the output produced by a successful match, R is the worker's reservation value and k is the value of the firm's outside option i.e. the cost of posting a vacancy (assuming free entry). Employed workers earn a wage $w = (x - R - k)$. Workers are taxed a lump sum tax τ_w. Each period the government collects tax revenues spent on unemployment benefits and other forms of household transfers. There is no government borrowing and so the tax rate balances the government budget constraint each period.

Agents in our economy solve the following problem:

$$\max E_0 \sum_{t=0}^{T} \beta^t U(C_t) \tag{1}$$

where C_t is the period's consumption.

3.1 The Labor Market

At the matching stage, vacancies and workers who are searching are matched through the following matching process. A vacancy searching meets an applicant with probability $q(\theta)$where $q : \mathbb{R}_+ \to [0, 1]$ is a twice-differentiable, strictly increasing and strictly concave function with boundary conditions $q(0) = 0$ and $q(\infty) = 1$. Similarly, a worker in a given submarket meets a vacancy with probability $\lambda(\theta) = q(\theta)/\theta$, $\lambda(0) = 0$ and $\lambda(\infty) = 1$. We refer to θ as the queue of applicants, that is the ratio of workers to available vacancies (the inverse of the labor market tightness). Unemployed workers consume b. We define the

"queue" as:

$$\theta \equiv \eta \left(\frac{u}{v} \right) \tag{2}$$

where u denotes unemployed workers, v is the mass of vacancies and η is a matching efficiency parameter.

The probability that a vacancy receives at least one applicant is:

$$q(\theta) = 1 - \exp(-\theta) \tag{3}$$

We now define the probability that a worker finds a job as:

$$\lambda(\theta) = \frac{q(\theta)}{\theta} \tag{4}$$

3.2 Value Functions

3.2.1 Workers

The value of an unemployed worker is:

$$V^u = R + \lambda(\theta) V^e(w) \tag{5}$$

where

$$R = A + b + \beta V^u \tag{6}$$

In other words, if an unemployed worker is not lucky in the labor market, he obtains the unemployment benefit and gets to search again in the following

period.

The value of an employed worker is:

$$V^e(w) = w - \tau_w + \beta[(1-\delta)V^e(w) + \delta R] \tag{7}$$

The value of a worker who does not participate in the labor market is:

$$V^n = A + T + \beta V^u \tag{8}$$

where T is the government transfer. This transfer can be interpreted as public assistance, disability benefits i.e. the share of government spending that is enjoyed by the inactive share of the working age population. The probability that an agent enters the labor market is $\Delta \equiv \Pr[\xi \geq \xi^*]$ where the threshold $\xi^* \equiv V^n - V^u$. ξ is assumed to be i.i.d and symmetric about its mean and can represent unobserved idiosyncratic ability or perhaps other unobserved characteristics that make some individuals more prone to market participation.

The worker's problem at the start of each period is:

$$V = \max\{V^u, V^n\} \tag{9}$$

3.2.2 Firms

The value of a vacant job is:

$$J^V = k + q(\theta)J^F \tag{10}$$

The value of a filled job us:

$$J^F = x - w + \beta[(1-\delta)J^F + \delta R] \tag{11}$$

We assume free entry and so vacancies are created until the surplus is exhausted such that:

$$k = q(\theta)J^F \tag{12}$$

3.3 The Government Sector

Given the government preference for providing public assistance to households, the government must choose the taxes and the unemployment benefit that balances its budget.

Tax revenues each period are paid by the employed population:

$$T = \tau_w N^e \tag{13}$$

where $N^e = \Delta\ \lambda(\theta)\ N$

$$G = N^u b + N^n T_n \tag{14}$$

where $N^u = \gamma_U \Delta\ [1 - \lambda(\theta)]\ N$, $N^n = \gamma_I(1-\Delta)N$. γ_U and γ_I represent the fraction of unemployed and inactive working age individuals who claim welfare income.

$zT = N^n T_n$ and so

$$b = \frac{T - (N^n T_n)}{N^u} = \frac{T(1-z)}{N^u} \tag{15}$$

Since the government budget constraint is binding, the tax

$$\tau_w = \frac{T}{N^e} = \frac{G}{N^e} \tag{16}$$

The government budget constraint is binding and so the tax τ_w is chosen such that $T = G$.

3.4 Equilibrium

An equilibrium consists of a queue $\{\theta\}$, tax schedule $\{\tau_w\}$ and unemployment benefit $\{b\}$ that satisfy the worker and firm value functions such that government budget constraint holds with equality.

3.5 Algorithm

For any given level T_n and z

- Set an initial guess for the tax $\{\tau_w\}$ and unemployment benefit $\{b\}$
- Guess on the population that enters the labor market
- Compute the queue and the implied job finding rates from the matching technology described in the earlier section of the paper

- Using the job finding rate, update the value of workers, firms and compute tax revenues as well as government expenditures.

- Check that the government constraint holds otherwise update the tax and the value of the unemployment benefit

- Using the model outcomes, update the initial population guesses and iterate until convergence. A steady state equilibrium is reached when the job finding rates are constant after each iteration, i.e. the model outcome has converged to the inital guess and so the fraction of workers who participate in the market each period is constant. In addition, the tax and unemployment benefit are such that the government runs a balanced budget.

4 Quantitative Analysis

For our analysis, we divide parameters into fixed parameters which are observed and directly taken from the data and free parameters which are estimated to match moments from the same data. Our fixed parameters include $\widetilde{\beta}$ which is chosen to match the US yearly interest rate. The retirement rate $\Omega = 0.04$, implying that 4% of workers exit the market each period. We use the US yearly average job separation rates. We obtain γ_U the fraction of unemployed claiming welfare income from the US census for each year respectively. We can also retrieve γ_I the fraction of inactive workers who report welfare income from the data.

There are four free parameters chosen jointly to match the following moments from the data: the labor force participation rate, the unemployment rate, the real wage, the ratio of welfare income to market income. Tables containing the value of fixed parameters and estimated parameters are included in the appendix.

Results from our analysis suggest that the value of welfare income increased while the value of market participation decreased. The following table shows the gains from labor force participation in Ohio in 2007 and in 2014.

Table 3: Model Results	**2007**	**2014**	% change
Gain from LFP ($V^u - V^n$)	29.0612	24.9017	-14.31%
V^u	33.3887	29.5626	-11.46%
V^n	4.3274	4.6608	7.70%

Table 4 highlights results from a counterfactual: What would the labor market look like under Governor Kasich if economic conditions resembled the pre-crisis period? Holding output per worker, the value of transfers and matching efficiency parameters fixed at their 2007 levels, we investigate the effect of the change in z to the 2014 levels: a change to the parameter that estimates government policy.

Table 4: Counterfactual	Data: 2014	Data: 2007
LFP rate	0.888	0.860	0.882
Unemployment rate	0.0584	0.0610	0.0580

Table 5: Model Results	**2007** ($z = 0.9988$)	**Counterfactual** ($z = 0.1749$)
Gain from LFP ($V^u - V^n$)	29.0612	29.8079
V^u	33.3887	33.9584
V^n	4.3274	4.1505

Table 6: Model Results	Kasich Effect
Gain from LFP ($V^u - V^n$)	2.57 %
V^u	1.71%
V^n	-4.09%

Our results indicate that if economic conditions resembled the pre-crisis period, the change in the policy regarding welfare transfers would have led to an increase in labor force participation of approximately 0.6 percentage points. On the other hand, the unemployment rate would have also increased by 0.04 percent. When we assume that all inactive workers collect welfare payments, the policy effect goes from a 0.6% to a 2% increase in LFP. Governor Kasich' administration contributed to a 2.57% increase in the gains from labor force participation.

4.1 Discussion: Welfare Spending in the Long Run

In this section we compare steady state outcomes to investigate the effects of an increase in the value of government transfers to inactive households. As the share of tax revenues that goes to inactive households increases at the expense of benefits to job seekers, fewer workers self-select to enter the labor market.

Those who enter are also more likely to find a job since the labor market becomes less congested (see fig. 3). The result is higher inequality since the net losers are job seekers. This negative effect of welfare transfers is accentuated in a weak economic climate.

In figure 4, we show the effects of a decrease in output conditional on the government attitude toward welfare tranfers. The negative effects of declining output are accentuated in a welfare state. Aggregate welfare declines at a faster rate. Fewer employed workers pay higher taxes to provide transfers to the larger inactive population.

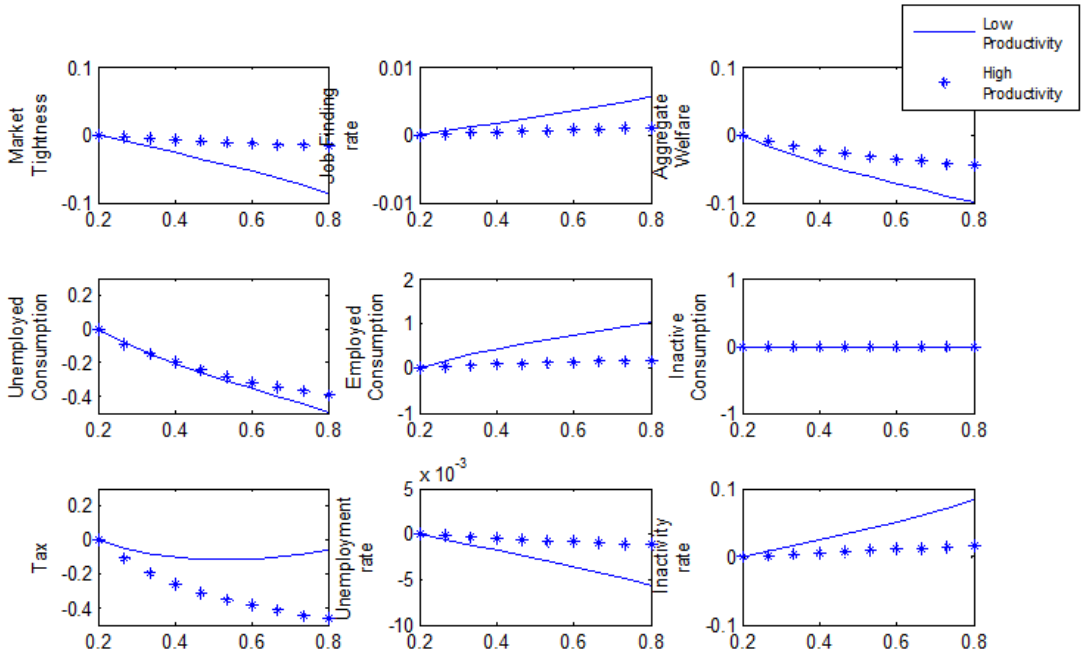

Fig. 3: Effect of Welfare Transfers

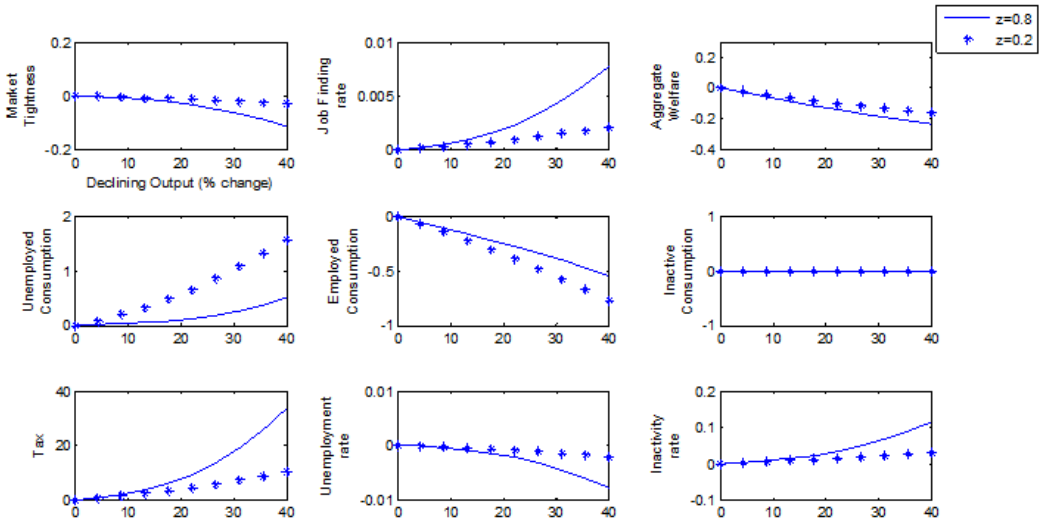

Fig. 4: Declining Output

5 Conclusion

In this article, we construct a dynamic equilibrium search model of the labor market augmented to include a government sector. We learn that an increase in the share of government revenues that is spent on welfare programs can cause labor force participation to decrease. Welfare transfers discourage labor force participation of less able workers. A smaller number of high ability individuals enter the labor market, and are also more likely to find employment. The outcome is higher inequality since the larger inactive population is left equally sharing the collected tax revenue. Our results are particularly interesting since policymakers who are concerned with reducing inequality often advocate for

increases in welfare spending.

Using Census data for the state of Ohio, we learn that if economic conditions in 2014 resembled the pre-crisis period, Governor Kasich'policy toward welfare transfers would have led to an increase in labor force participation by approximately 0.6 percentage points. On the other hand, the unemployment rate would have also increased by 0.04 percent. We define the gains from labor force participation as the value of market participation net the value of welfare income. Our results suggest that Governor Kasich' administration can be credited for a 2.57% increase in the gains from labor force participation. The simplicity of our reduced form model provides a great tool for educators and policymakers. The model can easily be extended to answer a substantial number of related policy questions.

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APPENDIX

Model Parameters

Table 7: Fixed Parameters

Discount factor	$\widetilde{\beta} = 0.96$
Retirement rate	$\Omega = 0.04$
Job separation rate	$\delta_{2007} = 0.017, \delta_{2014} = 0.015$
Ohio Transfer recipients in 2007*	$\gamma^{Ohio}_{U,2007} = 0.035; \gamma^{Ohio}_{I,2007} = 0.046$
Ohio Transfer recipients in 2014	$\gamma^{Ohio}_{U,2014} = 0.048; \gamma^{Ohio}_{I,2014} = 0.056$

*Fraction of inactive population receiving welfare income

Table 8: Ohio_{2007} Estimated Parameters

		Data Target
Output per worker	$x = 29.7954$	Wage income
Government budget parameter	$z = 0.9988$	LFP rate
Matching function parameter	$\eta = 0.1369$	Unemployment rate
Value of Transfer to Inactive HHs	$T_n = 0.7829$	Ratio of welfare income to market income

Table 9: Ohio_{2014} Estimated Parameters

		Data Target
Output per worker	$x = 26.1982$	Wage income
Government budget parameter	$z = 0.1749$	LFP rate
Matching function parameter	$\eta = 0.1479$	Unemployment rate
Value of Transfer to Inactive HHs	$T_n = 0.6146$	Ratio of welfare income to market income

Wages, Unemployment benefits and Welfare Income

Table 10a: IPUMS USA	2007	2014
Welfare income claim	2194.038	2025.652
Unemployment claim	2114.286	2833.636
Yearly market income	49870.13	51737.51
Weekly Hours worked	44.23	43.29

Table 10b: IPUMS USA	2007	2014
Welfare (relative to market income)	0.044	0.039
Unemployment benefit (relative to market income)	0.042	0.055

Welfare income to inactive households has decreased while the unemployed benefit increased relative to market income. These facts are consistent with a decrease in the value of staying out of the market.

The General Revenue Fund

In tables 11a, 11b and 11c, we compare changes in the General Revenue Fund (GRF) Expenditures in real terms between 2007 and 2014. Ohio State General Revenue fund disbursements can be obtained from the Ohio Office of Budget and Management *(http://obm.ohio.gov/Budget/monthlyfinancial/default.aspx).* The share of disbursements that go to Public Assistance and Medicaid has increased.

Table 11a : **Disbursements (in thousands) 2007/CPI=582.343 (1967=100)**

Education	4,788,797 (8223.33)
Public Assistance and Medicaid	5,290,167 (9084.28)
Health and Human Services	658,754 (1131.21)
Community and Economic Development	85,227 (146.35)
Tax relief/Property tax reimbursement	617,254 (1059.95)
Other Expenditures	1,579,460 (2712.25)
Total	13,019,659 (22357.37)

Table 11b : **Disbursements (in thousands) 2014/CPI=706.977**

Education	4,645,563 (6571.02)
Public Assistance and Medicaid	7,310,019 (10339.83)
Health and Human Services	653,057 (923.73)
Community and Economic Development	-
Tax relief/Property tax reimbursement	893,067 (1263.22)
Other Expenditures	1,880,872 (2660.44)
Total	15,382,578 (21758.23)

In 2007, Public assistance and Medicaid made up 40.6% of all GRF disbursements, up to 47.5 % of GRF disbursements in 2014. Total GRF disbursements decreased by 2.68%, however spending on public assistance and medicaid increased by 13.82%.

Table 11c : **Disbursements (in thousands)**	**2011**	**2012**
Education	4,704,566	4,621,675
Public Assistance and Medicaid	5,860,256	6,765,225
Health and Human Services	592,201	555, 938
Community and Economic Development	55,835	47,411
Tax relief/Property tax reimbursement	841,655	865,060
Other Expenditures	1,602,883	1,350,212
Total	13,657,396	14,205,521

Table 11c reveals that Public assistance made up 42% of the GRF actual disbursements in 2011 and 47.6% of expenditures in 2012.

Table 11d: **Receipts (in thousands)**	**2007**	**2014**
Tax Receipts	8,695,846 (14392.5)	9,968,148 (14099.7)
Non-Tax Receipts	2,971,687 (5102.98)	4,618,300 (6532.46)
Transfers	255,986 (439.58)	52,730 (74.59)

Table 11d reveals that tax receipts decreased by 2.03% in real terms while it is non-tax receipts that in fact have contributed to the increase in the General Revenue Fund receipts. Most of this increase in non-tax receipts was provided by the Federal government in the form of grants and reimbursement to the state for certain GRF expenditures made by the Department of Job and Family Services. In 2007 non-tax receipts made up 25.6% of all receipts while in 2014, these federal grants made up 31.6% of all receipts. Taking inflation into account, we learn from the tables that GRF Expenditures are 2.68% below

expenditures during the pre-recession Taft administration. Despite an overall decrease, public assistance and medicaid are 13.82% higher in 2014 under Governor Kasich than under Governor Taft in 2007.