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ABSTRACT

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The paper examines social transfers and their influence on the labour supply of women in Kyrgyzstan. Social transfers in cash and in kind in place in Kyrgyzstan absorbed 5.7% of GDP in 2012. They include subsidies to social insurance pensioners, transfers to population groups considered vulnerable or deserving, and transfers to families with children in extreme poverty. Social transfers are generally pro-old and maternalist in orientation, and therefore strongly gendered. Using data from the Life in Kyrgyzstan survey, the paper throws light on whether social transfers are associated with labour supply decisions of women at the extensive and intensive margins, and with birth spacing. The results indicate that social assistance transfers are associated with lower probabilities of participation and hours for women and marginally increase the relative risk giving birth.

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1. Introduction

Kyrgyzstan redistributes a significant share of government revenues through social transfers, around 5.7% of GDP in 2012 (World Bank, 2013). They reach a large share of the population. In 2013, just below one half of the population lived in households with a social transfer recipient. Against a background of low and stagnant labour force participation by women, the influence of social transfers on women's labour supply merits urgent consideration. The extent to which of social transfers influence women's labour supply decisions has implications for income security, productivity, and economic performance. Using a panel dataset covering 2010-2013, this paper investigates whether social transfers, especially transfers focused on poor families with children, have measurable effects on women's labour supply.

The social transfer system in Kyrgyzstan remains complex and fragmented, in spite of repeated attempts at reform. As with other Former Soviet Union (FSU) countries, social policy in Kyrgyzstan has lagged behind the economic transition. Before the transition, full employment policies relegated the role of social transfers to supporting families and to providing a minimum income floor to population groups deemed unable to work (Falkingham & Vlachantoni, 2010). Economic liberalisation undermined employment guarantees and the protection provided by state owned enterprises. Unemployment, underemployment, and informality are now a feature of Kyrgyzstan and other transition economies (Schwegler-Rohmeis, Mummert, & Jarck, 2013). Adapting to the new conditions recommends change in the orientation of social transfers. In the absence of full employment, the primary roles of social transfers are to address poverty and to sustain a social minimum capable of facilitating economic inclusion, growth and productivity.

The recent evolution of social transfers in Kyrgyzstan reflects tentative efforts to re-purpose the relevant policies and institutions, against a background of considerable barriers to institutional change.¹ Examining the potential influence of social transfers on the labour supply of women helps to throw light on the extent of this re-purposing, and on whether social transfers, social assistance transfers to poor families with children in particular, facilitate economic inclusion and growth. While the labour force participation of men has been rising moderately in the last decade, the labour force participation of women has stagnated or declined (Schwegler-Rohmeis et al., 2013), a trend observed since the start of the transition (Anderson & Pomfret, 2003). It is important to examine whether social transfers are contributing to maintaining low labour force participation levels among women. Women's engagement in the labour market also has direct implications for household income security, productivity, and economic performance.

¹ In 2011 the Government of the Kyrgyz republic approved a new Social Protection development Strategy for 2012-2014.

Social transfers can have powerful effects on labour market incentives, at the intensive margin, i.e. hours of work, and at the extensive margin, i.e. labour force participation (Saez, 2006). A substantive literature is concerned with the effects of social transfers on labour supply incentives in high income countries (Moffitt, 2002). There is particular concern regarding labour supply incentives associated with social transfers addressing poverty. In designing antipoverty policy, policy makers are commonly motivated by non-welfarist objectives, for example a minimum income or consumption level, but adverse labour supply incentives might actually militate against transfers securing this objective. The unequal distribution of care within the family adds a layer of complexity to the study and evaluation of the labour supply effects of social transfers on women. Given non-welfarist objectives, policy heavily discounts the value placed by households on non-paid work ('leisure' in the standard labour supply model), and women in low income households face difficult trade-offs between market work and unpaid care (Folbre, 1993). Social transfers focused on poor households can have strong influence on this trade-off and therefore merit particular attention.

The analysis in the paper relies on the data from the "Life in Kyrgyzstan" (LiK) survey (Brück et al., 2014). LiK is multi-purpose, socio-economic survey collected in four waves from 2010 to 2013. It estimates models of participation and hours to identify associations between social transfer subsidies and incidence on the one hand and labour market decisions by women at the extensive and intensive margins on the other. The analysis in the paper also studies the potential association of social transfers and birth spacing. It finds that pension transfers are correlated with lower probability of participation and fewer hours of work among adult women. This association is weaker for social assistance transfers, especially in the later years when their incidence increased. It also finds that social assistance transfers are associated with reduced birth spacing.

The paper is organised as follows. Section 2 examines the design, incidence, and transfer levels associated with social insurance and assistance transfers in Kyrgyzstan and reviews hypotheses on their influence on labour supply decisions. Section 3 discusses trends in women's labour supply, especially 2010 to 2013. Section 4 examines the associations existing between social transfer values and incidence on adult women's labour force participation and hours. Section 5 provides the estimates of the relationship between social transfer values and incidence on adult women's labour force participation and hours based on panel data. Section 6 examines the relationship existing between social transfers and birth spacing. A final section considers the implications for policy and concludes.

2. Social transfers in Kyrgyzstan

It is helpful to distinguish between three different types of transfers: social insurance transfers, social assistance transfers, and emergency assistance transfers. Their predicted effects on labour incentives are substantively different.

Social insurance schemes address life course and employment related risks and are normally financed through payroll contributions from employees and employers. Their main labour supply effects arise from features encouraging withdrawal from the labour market, i.e. retirement, and from effects on the labour supply of other household members associated with the coverage of dependants. Generous social insurance pension provision will encourage retirement among contributors and might reduce incentives for labour supply and saving among dependants.

Social assistance transfers address poverty and vulnerability and are budget-financed. Generous social assistance transfers might reduce work incentives among recipient households, especially among low skilled groups. Categorical social assistance transfers are often focused on groups with weak labour market engagement - for example people with disabilities or long-term sickness, older people, or mothers with infants – and might strengthen incentives for reduced labour supply. Focusing transfers on these groups would enable policy-makers to provide more generous transfers without large adverse labour supply incentives (Akerlof, 1978). Social assistance transfers focused on low income households might actually strengthen labour supply incentives by providing a reliable income floor, and therefore countering the uncertainty associated with irregular employment and earnings, or by compensating for costs associated with employment, especially child care (Barrientos & Villa, 2015). Subsidies to services or goods which are complementary to employment, child schooling for example, also have the potential to enhance labour supply (Kolm & Lazear, 2010).

Emergency assistance usually consists of one-off payments to compensate for adverse events. They are unlikely to generate significant labour supply incentives.

Current social transfers in Kyrgyzstan do not represent a radical departure from the legacy of the soviet era. As regards social insurance, there is a single public social insurance fund collecting contributions and paying out benefits. Pensions and health insurance are the two most important components of social insurance. Affiliated workers contribute 10% of their earnings, 8% towards a flat rate basic pension paid to workers reaching retirement age (60 for men and 55 for women)² and 2% towards a notional defined contribution supplementary pension. Employers contribute 15% of payroll towards the basic pension, 2% towards health insurance, and 0.25% towards work related injuries insurance. The combined payroll contributions are therefore 27.25% of payroll. Self-employed workers can join the social insurance scheme providing they contribute 9.25% of gross earnings. Dependants of contributing workers are also entitled to disability and survivor benefits. Entitlement to the basic pension benefit requires workers to meet a minimum years of contributions in addition to the age requirement. The vesting period, minimum length of

² A social insurance reform in 2007 legislated that the retirement age would be gradually pushed back from 60 to 63 for men and from 55 to 58 for women, but in 2010 the reform was suspended (Schwegler-Rohmeis et al., 2013).

contribution required to become eligible for pension benefits, is 25 years for men and 20 years for women. The basic pension benefit replacement rate, the ratio of pension benefits to labour earnings, is estimated at 35% (Schwegler-Rohmeis et al., 2013).

The rise in the share of the labour force working informally has led to a reduction in social insurance coverage, undermining its financial sustainability. Schwegler-Rohmeis et al (2013) report that informality rates are above 90% in rural areas and are above 50% in urban areas. The growing share of informal and precarious employment among new jobs suggests that the rise in informality is set to continue into the future.

Government support for pensioners has increased since 2010, through additional transfers financed from its own revenues. They include an early retirement scheme and cash top ups. Close to 50,000 pensioners (out of a total of 550,000) received top ups in 2011, and close to 50,000 mothers with many and/or disabled children and 20,000 former workers in high altitude areas were entitled to early retirement. These two categories of expenditure absorbed 0.84% of GDP in 2012. Pensioners, and some in the other categories mentioned above, are also entitled to electricity subsidies, absorbing a further 0.58% of GDP in 2012 (World Bank, 2013).

Pensioners are also the largest group receiving in kind transfers (described in Kyrgyzstan as privileges or compensation). They were transformed into a cash subsidy, monetised compensation, in 2007-10. In 2012 they absorbed 0.63% of GDP. There are 25 specific categories of people entitled to cash compensation in lieu of in-kind transfers, mainly groups unable to work and perceived to be especially vulnerable. Among these groups, certain categories are also entitled to a cash transfer, the Monthly Social Benefit, with varying benefit levels in the range KGS1000-KGS3000.

The Monthly Benefit for Families in Poverty (MBPF) is the only social assistance transfer focused on families with children in extreme poverty. Entitlement to the transfer is based the presence of children in the household combined with income and asset tests. The transfer is supposed to cover the difference between children's per capita household income and the Guaranteed Minimum Income (GMI) a discretionary threshold set by the Government. In 2011, the level of the GMI was KGS370 equivalent to around 1/3 of the extreme poverty line. Families qualifying for the MBPF are also entitled to a one-off maternity payment and to an additional monthly maternity benefit for 1.5 years after the birth of the child. The MBPF has the objective of ensuring that children in poorest households are guaranteed at least the GMI.

Table 1 provides summary information on the coverage, expenditure, and transfer levels of the different social transfers. Around 10% of the population receive pensions from the social fund. Most of them are entitled to energy compensation financed from government revenues. The next largest programme in terms of coverage is the MBPF, if the family group is counted as beneficiaries. Monetised compensation and the MSB absorb 1.5% of GDP,

around 40% of the social protection budget. The mean values of the transfers shown in the Table indicate that, apart from the MBS and the monetised compensation, the per capita amounts transferred are a fraction of the poverty line. With the MBS and monetised compensation, it is likely that transfers are shared within households, so that the per capita share of the transfer is significantly lower than the amounts reported in the table. Of course, many households receive more than one transfer, and therefore the total transfer amount will be larger for them.

	Coverage (,000)	Expenditure as % GDP	Mean transfer value monthly KGS
Basic Pension	550		
Early retirement	77.6	0.2	105
Pension top ups	48	0.57	410
Energy compensation	516	0.64	270
Monetised compensation	56	0.93	1000-7000
MSB	70	0.55	2500
MBPF	377	0.49	464
Data source (World Bank, 2013)			

Table 2 shows income packages separately for all households, households in extreme poverty, and MBPF beneficiary households. They show the contribution of social transfers to household income as estimated by Gassmann & Zardo Trinidad (2015) using the 2012 Kyrgyz Integrated Household Survey (KIHS) data. The income packages of these three categories of households look fairly similar. Income from labour earnings, including from agricultural activities, contributes over three quarters of household income, but it is a smaller share of the household income of MBPF beneficiaries. Focusing on the income from social transfers, pension income is the next significant component, at around one sixth of household income for the average household, but just above 10% for the MBPF households. Income from the MBPF is significantly larger from MBPF beneficiaries at around 6.2% compared with families in extreme poverty. Unfortunately, the 2012 KIHS did not capture the energy compensation payments. The early retirement and pension top ups are likely to be subsumed under pensions.

Combined, social transfers account for 15.5%, 19.8% and 17.7% respectively of the household income of the average family, families in extreme poverty, and families receiving the MBPF. These figures suggest that social transfers are not especially focused on poverty or low incomes, but they reach a wide share of the population. By contrast, the income packages show the MBPF is reasonably well targeted on the poorest households with children and has a strong focus on poverty and low incomes.

Table 2. Contribution of social transfers to household income - 2012			
Income component	All	Extreme poor	MBPF recipients
Labour earnings inc. from agriculture	80.5	76.7	77.7
Other income	0.9	1.0	0.7
Private transfers inc. remittances	11.7	22.8	18.2
Pension	14.8	18.6	11.1
MSB	0.1	0.2	0.2
MBPF	0.4	0.9	6.2
Other social transfers	0.1	0.1	0.2

Source: Gassmann and Zardo Trinidad (2015) estimates based on data from KHIS 2012. Extreme poor are households with per capita income below the food poverty line

Summarising, the key features of social transfers in Kyrgyzstan are:

- Social transfers taken as a whole provide around one fifth of low-income households' income.
- Social transfers are pro-old and maternalist. Older people, people with disabilities, and mothers are the primary target groups.
- Given co-residence, social transfers taken as a whole are well distributed across the population.
- On the assumption that transfers are shared within households, mean transfer values are not large relative to household income, although social transfers might be a large source of income for households with particular composition.
- Taken as a whole, social transfers are not particularly focused on low-income households, they reach a large share of the population.
- The MBPF is reasonably well targeted on low-income families with children.

3. Trends in women's labour supply

The empirical analysis in the paper relies on data from the Life in Kyrgyzstan (LiK) survey 2010-2013.³ The LiK collects longitudinal data on a nationally representative sample of households in seven Kyrgyz oblasts and Bishkek and Osh cities.⁴ Participant households were selected through a stratified two-stage proportional to size sampling strategy, based on the 2009 Population Census. The survey instrument consists of community, household, and individual questionnaires. The individual questionnaire is implemented on all adults

³ Information on the LiK survey and on access to the data are available from <http://www.diw.de/kyrgyzstan>. For survey details see (Brück et al., 2012).

⁴ The oblasts are Batken, Chui, Djalal-Abad, Issyk-Kul, Naryn, Osh, Talas, Bishkek, and Osh.

(aged 18 and above). The survey tracks individuals, including the children who become adults, and includes new household members. During the first wave in 2010, information was collected on 3000 households and 8160 individuals. The fourth wave collected information on 2920 households and 8648 individuals in 2013.

Table 3 provides information on labour force participation rates for males and females for each cross-section and for the panel dataset. Significant differences can be expected for the cross-sections and panel figures given the high and variable incidence of labour migration in Kyrgyzstan. The survey data supports alternative measures of participation. Responses to questions on whether respondents are in work or have a job tend to be very restrictive, as they leave out those looking for employment or in between jobs. The figures for participation in the Table include respondents who state they are looking for employment or are waiting to start a job. We also included as participants respondents who are waiting for the seasonal work to pick up. In Kyrgyzstan's case, it is important to pay attention to labour migration. We included as participants individuals who are included in the household roster, but who are away at the time of the survey and the household respondent gives work or business as a reason for their absence. The measure of labour force participation we use in the empirical work is fairly comprehensive.

Medium term trends in women's labour supply show a declining trend since independence. Anderson and Pomfret (2003) use data from 1993 and 1997 and report that labour force participation rates declined for men from 77.4% to 65.8% and for women from 57.5% to 44.3%. The LiK data for 2010-2013 show comparable participation rates for men (aged 18 to 59) in the cross-sections, but significantly lower rates for the panel dataset. This is probably due to the high incidence of migration among males, sharply lowering their likelihood to be present in all four waves of the survey. The 2010-2013 participation rates for women (aged 18 to 59) are significantly lower than the Anderson and Pomfret estimates. There is large variation across years, rising in trend to 2012 and they experiencing a large decline. Among women, rates of labour force participation in the cross sections start at 47% in 2010 rise to a peak of 58% in 2012 and fall to 44% in 2013. In the panel, the rates of labour force participation start at 41%, rise to a peak of 54% in 2012 and then fall sharply to 41% in 2013.

Year	Cross-section		Panel	
	Men	Women	Men	Women
2010	0.74	0.47	0.69	0.41
2011	0.74	0.49	0.68	0.44
2012	0.86	0.58	0.80	0.54
2013	0.78	0.44	0.70	0.41

Source: Own calculations using LiK data. Men and women aged 18-59.

With data from the 2013 wave we can throw light on reasons provided for non-participation inactivity. Among women of working age who did not report an economic activity, the vast majority of non-participants gave housework and child care as the main reason.

4. Women's labour supply: Do social transfers matter?

This section reports on the estimates from models of labour force participation and hours for women aged 18-59. The main objective of this analysis is to establish whether receipt of social transfers and childcare responsibilities influence women's labour supply decision in Kyrgyzstan.

What are the likely influences of social transfers on labour supply decisions? Functionally, social transfers cover six categories of payments: (i) social insurance old age, disability, and survivor pensions; (ii) early retirement and pension top ups; (iii) energy compensation subsidy; (iv) monetised in kind subsidy; (v) Monthly social benefit; and (vi) Monthly social benefit for families in poverty. Analytically, (i) is social insurance, while (ii)- (vi) could be described as social assistance if focused on poverty reduction. In terms of labour supply incentives, (i) – (v) are focused on categories of individuals who are not expected to work. In the case of (i) pensions, there is an expectation of direct beneficiaries withdrawing from the labour force.⁵ In (ii) to (v), social transfers are not expected to influence labour supply incentives among direct beneficiaries. However, social transfers (i) to (v) could influence the labour supply decisions of dependants and co-residents. As regards (vi), social transfers can influence labour supply decisions among working age direct beneficiaries, but the strength of the effect depends on the level of the transfer which in turn depends on the number and age of children.

Focusing on the labour supply decisions of women of working age, they can be influenced, directly or indirectly, by (i), (ii), (iv), (v) and (vi). The direction and strength of the effects vary with the age, family composition, and care responsibilities. For example, women in formal employment near the age of retirement might have incentives to work longer to qualify for the vesting period whereas mothers with infants below 1.5 years in extreme poverty might face a significant reduction in transfers if they work.

A starting point is a standard static model of labour supply, where individuals maximise a utility function with constant elasticity separable in consumption and leisure (Benczur, Katay, Kiss, & Razcz, 2014), as in

⁵ This is a general finding from studies on pension schemes. A study of pension schemes across the world concluded that, in spite of their diversity, they shared an important common feature: to support withdrawal from the labour market (Mulligan & Sala-i-Martin, 1999). In employment based pension schemes access to pension benefits at a specified age is normally dependent on retirement from the labour force. By contrast, budget-financed pension schemes, also described as social pensions or non-contributory pensions, seldom include a requirement that recipients exit the labour market. However, several studies show that even in the absence of work test, benefit receipt is associated with labour market withdrawal. The incentives for labour market withdrawal usually depend on the level of the transfer and the age of entitlement (Carvalho, 2008; Ferreira, 2006).

$$\max \frac{c^{1-\psi}-1}{1-\psi} + \frac{\chi(1-l)^{1-\phi}-1}{(1-\phi)} \quad (1)$$

$$\text{s.t.} \quad c_i + (1 - l_i)w = T + wH$$

where w is the wage, c is consumption, l is labour, T is unearned income including transfers, and H is total hours available. χ is utility of leisure and ϕ and ψ are constants. Normalising total time available H to 1, the optimality condition is

$$\chi(1 - l)^{-\phi} = wc^{-\psi} \quad (2)$$

From (2) a reservation wage w_r can be defined, as it is consistent with $1-l^*=1$ and $c=T$. The decision whether to participate depends on $w \geq w_r$. Replacing $\ln\chi$ with a linear function of observable individual characteristics Z_i as in $\ln\chi = Z_iA' + \varepsilon_i$, with $\varepsilon_i \sim N(0, \sigma^2)$, and taking logs, the participation decision can be written as

$$\ln w_i - Z_iA' - \psi \ln T_i \geq \varepsilon_i \quad (3)$$

leading to the standard structural probit specification

$$P(\text{part}) = \Phi\left(\frac{\ln w_i - Z_iA' - \psi \ln T_i}{\sigma}\right) = \Phi(\gamma \ln w_i + Z_i\alpha' - \bar{\psi} \ln T_i) \quad (4)$$

With regard to the intensive margin, a conventional Tobit hours equation was fitted to the data,

$$h_i = \ln w_i + Z_iA' + \varepsilon_i \quad (5)$$

To address the issue of missing data, earnings were predicted for women who are not participating in employment. This was done by estimating jointly the probability of participation and earnings and then using predicted earnings to estimate a participation probit. The same exercise was repeated for 2011, 2012 and 2013. The next section reports on panel regressions.

To predict earnings, the wage equation included age, age squared, whether married, whether completed primary education, whether completed tertiary education, and oblast (with Bishkek and Osh treated as oblasts). The participation equation included in addition variables capturing non-labour income (pension income, social assistance income, property income, and remittance income) at the household level as well as the number of children in the household.

The estimates from the participation and hours models aim to capture the correlation of participation and hours with receipt of social transfers, in particular pensions and social assistance transfers to poor families with children on the one hand, and with fertility and child care variables on the other. Regarding fertility and childcare, the relevant variable employed was the number of children below 17 years of age per woman. The 2010 wave did not capture data on the number of children per woman, but only on the number of children

in the household *#children(hh)*, the variable used in this estimation. For the other years *No of Children* captures the number of children per mother. The expectation is that higher numbers of children restrict women's labour supply.

To identify correlates of participation and hours with receipt of social transfers the models include variables capturing the receipt of pensions (social insurance) and receipt of social assistance (Monthly Social transfer for poor families with children).⁶ As indicated in the previous section, expectations on the influence of social transfers on labour supply decisions vary across transfer type. Alternative specifications of these variables capture the amounts received by the household for each of these transfers and alternatively the number of transfers of a particular type received in the household. Due to variation in the design of the questionnaires across the waves with respect to the maximum number of transfers per household captured, we opted for a binary variable establishing whether or not households receive a transfer of a specific type.

To focus attention on the variables of interest, Table 4 reports only on the relevant parameters for 2010, 2011, 2012, and 2013 using the cross-sections. The Table reports on two Models. Model 1 includes the number of children per woman and focuses on social transfer income. Model 2 replaces the social transfer income variables with variables capturing social transfer incidence, and replaces the number of children per mother with a binary indicators with a value of 1 if the mother has no reported children. Because social assistance transfers are focused on poor families with many children we opted in Model 2 to replace the number of children per woman by a binary on whether women have zero children.

The estimates reported in the Table provide a mixed picture. We focus first on the results from Model 1, where social transfers are measured in terms of the monetary income contributed to the household. Taking pension transfers, the relevant parameters have the expected negative sign in all four years, but not significant in 2013. The size of the effects on women's labour participation and hours are relatively small. The parameter associated with pension income also has the expected negative sign in the hours model, but a positive sign in 2013. It is not significant in 2010. The parameters associated with social assistance have the expected negative sign in 2010- to 2012, but a positive sign in 2013. The parameters are significant in 2012, marginally significant in 2010, and are not significant in 2012 and 2013.

⁶ In the analysis below, social assistance transfers refer exclusively to the Monthly Social Transfer to Poor Families with Children.

Table 4. Selected parameter estimates from participation and hours models for adult women in Kyrgyz using LiK data 2011-13

2010	Model 1				Model 2			
	Participation	Marginal	Mean (sd)	Tobit-Hours	Participation	Marginal	Mean(sd)	Tobit-Hours
Pension income	-0.0000** (0.000)	-1.14e-06**	1,210 (2,124)	-0.0019 (0.00234)				
Soc. ass. income	-0.0004* (0.0002)	-0.000143*	15.68 (215.0)	-0.0327 (0.0398)				
Pension receipt					-0.18385*** (0.0540)	-0.0632*** (0.476)	0.346 (0.476)	-21.96*** (8.463)
Soc ass. receipt					-0.2545* (0.135)	-0.0875* (0.169)	0.296 (0.169)	-13.85 (24.18)
# children(hh)	-0.1571*** (0.0360)	-0.0541***	0.714 (0.935)	-15.37** (3.207)				
no child					0.2307*** (0.0589)	0.0793*** (0.499)	0.533 (0.499)	28.31** (9.565)
Observations	3,687			3,688	3,687			3,688
R-squared	0.123				0.123			
2011	Participation	Marginal	Mean (sd)	Tobit-Hours	Participation	Marginal	Mean(sd)	Tobit-Hours
Pension income	-0.0001*** (0.000)	-3.4e-05***	1,546 (2,609)	-0.00963*** (0.0033)				
Soc. ass. income	-0.0015*** (0.0000)	-0.00051***	23.10 (215.0)	-0.109** (0.0468)				
Pension receipt					-0.2595*** (0.0693)	-0.0894*** (0.481)	0.364 (0.481)	-43.08*** (8.034)
Soc ass. receipt					-0.3456** (0.166)	-0.119** (0.162)	0.0269 (0.162)	-64.75*** (22.51)
No of children	-0.3958*** (0.0791)	-0.133***	1.944 (1.465)	-30.5*** (10.18)				
no child					0.2621*** (0.0761)	0.0902** (0.381)	0.176 (0.381)	32.71*** (9.354)
Observations	2,785			2,786	2,785			2,786
R-squared	0.143				0.125			
2012	Participation	Marginal	Mean (sd)	Tobit-Hours	Participation	Marginal	Mean(sd)	Tobit-Hours
Pension income	-0.0001*** (0.0000)	-2.0e-05***	1,951 (2,976)	-0.0038** (0.0014)				
Soc. ass. income	-0.0000 (0.0002)	-1.26e-05	30.36 (201.6)	-0.0962 (0.0211)				
Pension receipt					-0.2688*** (0.0745)	-0.0925*** (0.483)	0.369 (0.483)	-30.13*** (8.406)
Soc ass. receipt					-0.2312 (0.2008)	-0.0796 (0.199)	0.0414 (0.199)	-29.04 (23.74)
No of children	-0.3212*** (0.0593)	-0.110***	1.951 (1.450)	-19.44*** (4.891)				
no child					0.1713** (0.0824)	0.0590** (0.371)	0.165 (0.371)	16.83* (8.694)
Observations	2,635			2,635	2,635			2,638
R-squared	0.126				0.127			
2013	Participation	Marginal	Mean (sd)	Tobit-Hours	Participation	Marginal	Mean(sd)	Tobit-Hours
Pension income	-0.0000 (0.0000)	-1.21e-05	2,301 (3,458)	0.00595* (0.00326)				
Soc. ass. income	0.0007	-0.000208	46.30	0.113*				

	(0.0005)		(293.2)	(0.0556)				
Pension receipt					-0.0842	-0.0269	0.404	-11.60
					(0.0709)		(0.491)	(9.543)
Soc ass. receipt					-0.0476	-0.0152	0.0655	-33.49
					(0.1434)		(0.247)	(22.79)
No of children	0.2032	0.0649	1.983	31.59**				
	(0.1292)		(1.406)	(15.38)				
no child					-0.0201	-0.00871	0.143	-4.744
					(0.1010)		(0.350)	(14.92)
Observations	2,322			2,322	2,322			2,322
R-squared	0.165				0.165			

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

When considering Model 2 where the variable of interest is social transfer incidence as opposed to income, the relevant pension incidence parameters are strongly significant in 2010 to 2012, but not significant in 2013. The parameters are relatively large. Living in a household with a pension recipient reduces women's participation rate by 6.3 percent lower in 2010 rising to 9.2 percent in 2012. Women living in a household with a pensioner work significantly fewer hours. In 2013, however, the relevant parameter in the hours model is signed as expected, but it is not significant. The parameters associated with social assistance transfers have the expected sign but are only significant in 2010 and 2011, and in 2010 the parameter is only significant at the 10 percent. In 2011, living in a household with a social assistance recipient was associated with 11.9 percent lower participation by adult women. Again, the parameter associated with social assistance receipt in the hours model is only significant in 2011.

Overall, these results are mixed. The analysis confirms that pension income and pension receipt are correlated with lower labour force participation and hours for women of working age, but the effect is not measured with precision in the context of social assistance transfers outside the 2011 data.

Considering the parameters associated with the presence of children all the estimated parameters have the expected sign and are significant, except for 2013. Having children is associated with lower participation and hours. In model 1, where the variable of interest measures the number of children per woman (per household in 2010), the marginal effects suggest that an additional child is associated with around 10 percent lower probability of participation. The parameter for hours is more variable across waves, but suggests children are associated with substantially fewer hours worked.

Turning to Model 2, where the variable of interest captures whether women are childless, the parameters have the expected sign and significance except for 2013. Reporting no having had a child is associated with higher rates of participation probabilities ranging from 5.9 percent in 2012 to 11.9 percent in 2011. The estimates for 2013 data lack significance and show a negative sign for participation and hours. Excluding the 2013 data, the estimates

provide support for the view that fertility and childcare constraints women's labour supply at the intensive and extensive margins.

The LiK survey included a question on the issue of elderly care only in the 2013 wave. The data show that 8.7% of adult men report providing care, compared to 9.5% of women. Analysis of these data, not reported here for reasons of space, indicates that elderly care responsibilities are associated with lower probability of participation among women, but not among men.

In sum, the results from the analysis of cross-sections point confirm that social transfers matter for women's labour supply, although the results are mixed. Pension income and pension receipt are correlated with lower participation and hours of work for women of working age. The issue whether this is due to pension income effects or care responsibilities, or to a mix of these, remains an important question for future research. Social assistance transfers matter less, the estimated parameters are weaker and measured with less precision. We cannot assert with confidence that social assistance transfers lower the probability of participation among adult women. They appear to do so in some years and not in others. And the increase in the reach of social assistance transfers as reported in the LiK data does not appear to have resulted in more precise estimates of a reduction in women's participation in later years. In fact, the observed associations weaken in later years. The analysis reported here cannot address issues of causality.⁷ We are not able to assess with confidence whether the negative parameter associated with measures of social assistance income and incidence observed for some years reflects a labour supply response to the transfers or the fact that social assistance transfers act as identifiers for low income households with children.

5. Panel estimates

The cross-section estimates show significant variation in the estimated parameters across the four waves of the data. Together with the measures of labour force participation in Table 3, they suggest rapidly changing conditions in the Kyrgyz labour market. In this section we report on estimates using pooled LiK data. We focus on a balanced sample of the LiK data 2010-13 including 2388 women aged 18-60 present in all four waves of the data.

The estimation of a labour supply model with panel data poses two main challenges. First, we need to address non-randomness in the subsample of the population with information on earnings and hours. Second, attention needs to be paid to unobserved individual effects in the event they might be correlated with model parameters.⁸ Wooldridge (Wooldridge, 1995, 2002) proposes an estimation strategy relying on the assumption that unobservables enter linearly in the conditional expectation of the errors. In a two step estimation, the first

⁷ But see Gassmann and Zardo Trinidad (Gassmann & Zardo Trinidad, 2015).

⁸ Differencing can deal with time invariant unobserved characteristics, but cannot address the way time variant unobservables influence selection (Dustmann & Rochina-Barrachina, 2007).

step is to estimate a selection equation for each year keeping the inverse Mills ratios (IMR) while in a second step the IMRs are incorporated in the estimation of a labour supply equation. The basic model can be described as:

$$y_{it} = x_{it}\beta + c_i + u_{it} \quad ; \quad t = 1, \dots, T, i = 1, \dots, N \quad (6)$$

where c_i stands for unobservables and u_i is the residual. The selection equation is an indicator function

$$s_{it} = 1[x_{it}\psi_t + v_{it} > 0] \quad (7)$$

Under the following assumptions:

$$E(u_{it}|x_i, v_{it}) = E(u_{it}|v_{it}) = \rho_t v_{it}$$

$$E(c_i|x_i, v_{it}) = x_i\pi + \Phi_t v_{it} \quad ,$$

the model to be estimated (Wooldridge, 2002) is

$$y_{it} = x_{it}\beta_t + x_i\pi + \delta_t \lambda(x_i\psi_t) + e_{it} \quad (8)$$

β_t can be estimated consistently by first estimating a probit of s_{it} on x_i for each t saving the inverse Mills ratio $\lambda(x_i, \psi_t)$ for all i and t . In the next stage a pooled OLS regression is estimated for the selected sample including all IMRs. Predicted earnings are then used in the estimation of participation and hours. Table 5 reports on the parameters of interest for models 1 and 2 as identified in the previous section.

Table 5. Selected parameter estimates from participation and hours models for adult women in Kyrgyz using a balanced panel from LiK data 2010-13

2010	Model 1				Model 2			
	Participation	Marginal	Mean (sd)	Tobit-Hours	Participation	Marginal	Mean(sd)	Tobit-Hours
Pension income	-0.000*** (0.000)	-8.72e-06***	1,713 (2,773)	-0.0041*** (0.0008)				
Soc. ass. income	-0.00011* (0.0000)	-7.07e07*	26.69 (219.0)	-0.020** (0.0088)				
Pension receipt					-0.237*** (0.0330)	-0.085***	0.377 (0.485)	-37.11*** (4.525)
Soc ass. receipt					-0.126** (0.0635)	-0.0453*	0.041 (0.200)	-23.44*** (8.51)
# children(hh)	-0.0467*** (0.0120)	-0.0168***	0.1.632 (1.453)	-5.54*** (1.651)				
no child					0.947*** (0.0354)	0.0339***	0.268 (0.443)	3.676 (4.579)
Observations	9554			9554	9554			9554
R-squared								

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Whilst broadly confirming the results obtained from the cross-section regressions, the panel estimates offer greater precision in the estimation of the parameters. The parameters associated with pension income and pension incidence are negative and highly significant. Pension income and pension receipt are strongly correlated with low labour force participation among women aged 18-60. The parameters associated with social assistance transfers are negative, but only marginally significant for transfer income. They are estimated with greater precision in the context of social assistance transfer incidence, as they are significant at the 5% level. The tobit model estimates of the correlation between pension income and incidence on the one hand and hours of work on the other, are negative and highly significant. The tobit model estimates for social assistance income and incidence are estimated more precisely than in the labour force participation model. As regards incidence, the estimated marginal effects of pension incidence are about twice the size of the social assistance transfer incidence, but the latter is only marginally significant.

6. Social transfers and birth spacing

An interesting issue is whether social assistance transfers influence the spacing of births.⁹ Assuming, for the purpose of this argument, that women have a target number of children, the issue is whether maternalist social assistance transfers could accelerate the process of reaching this target. Studies on whether social transfer programmes have fertility effects have raised the possibility of birth spacing effects. A study for Norway shows that take-up of the cash benefit is positively associated with fertility timing, especially for having a second child in the first periods when couples receive the benefit (Aassve & Lappegård, 2009), while a study on the fertility effects of a cash transfer programme in Nicaragua for families in poverty has also considered birth spacing (Todd, Winters, & Stecklov, 2012). This section undertakes an analysis how social transfers affect on birth spacing of women in Kyrgyzstan.

We constructed a birth history for every adult woman in the LiK dataset, including information on the survival status of each child. The module on women's background and fertility first appeared in questionnaire on 2011. In the following years, only those women who had experienced changes in marital status and in the number of children were encouraged to respond. We therefore took the individual data on women's background and fertility for 2011 and merged the additional information from 2012 and 2013. In total, 1482 women aged between 18 and 45 with children with age below than age 17 years are left in the sample.

We examine birth spacing since the time of conception is not observed. Due to small number of women having a first birth under age 15, risk periods for each woman start at age 15. A risk period is defined as a period in which a woman is susceptible to having a birth. It ends when a birth occurs or when the observation period ends. The first risk period ends on

⁹ Birth Spacing describes to the time interval from one child's birth date until the next child's birth date.

the date of woman's first birth. Each subsequent risk period begins after the birth of a child. This means that the beginning and end dates of the risk periods depend on the women's birth date and the date on which the woman's first child was born. ¹⁰

Table 6 provides information on median birth intervals in months by parity.¹¹ The median birth interval is 97.54 months for women with one child. This is the interval between age 15 and the age of first birth of these women. Women with more than one child have shorter birth intervals. Columns 2 and 3 in the Table compare the birth intervals of women in households receiving social assistance transfers and those who are not recipients. The birth intervals of women in recipient households are shorter than for other women for a given parity level. The last two columns of the Table depict the median birth intervals of women by employment status.¹² Birth intervals for women in employment are longer than for other women, and they have fewer births.

Table 6 Median birth intervals by parity (months)

Parity	Median birth intervals	Median birth intervals, for women are receiving social assistance	Median birth intervals, for women are not receiving social assistance	Median birth intervals, for women who are in work	Median birth intervals, for women who are not in work
0	97.54	76.88	97.92	114.1	91.6
1	65.48	54.08	65.8	73.69	60.7
2	52.53	51.53	52.57	55.08	50.18
3	48.64	45.82	48.89	54.38	45.81
4	40.51	42.82	40.24	44.79	39.13
5	37.14	39.57	36.46	42.05	35.21
6	51.21	29.5	59.9	85	37.77
7	35	N/A	35	N/A	35
8	29.75	N/A	29.75	N/A	29.75
9	27.5	N/A	27.5	N/A	28
mean		50.1	67.46	73.89	62.61
(t-stat)		17.36 (3.83)		11.28(5.58)	

Source: Authors' calculations based on LiK data.

¹⁰ This measure of birth spacing does not capture reproductive intentions in full as it ignores miscarriages.

¹¹ The number of children previously born alive to a woman; for example, 'two-parity women' are women who have had two children and 'zero-parity women' have had no live births

¹² Women are in work if they report having had paid employment in the last week/month.

A hazard model is employed to evaluate the probability that a birth occurs for individual i in each time period t of the risk period, conditional upon the event not occurring in a previous time period (i.e. the individual is still at risk), given observed covariates (x):

$$h_i(t) = \Pr(T_i = t | T_i \geq t, x_i) \quad , \quad (9)$$

where T_i is the time period in which the event occurs, covariates x_i are time invariant. As risk periods and outcomes for each woman are likely correlated over time, we employed a multiple failure stratified Cox model. This model allows the baseline hazard function to vary across strata (i.e., non-proportionality for the stratifying variable) and guarantees that each woman is in each stratum only once. This removes the autocorrelation between a woman's observations in each stratum, but does limit the effects of covariates to be constant across strata. Our model includes stratification on parity at the start of each risk period. It provides the advantage that it limits the model so the outcomes are compared across women of equal parity. The strata s are defined by parity at the start of the risk period for parities zero (risk of first birth) through nine (risk of tenth birth):

$$h_{is} = h_{0s}(t) \exp(x_i\beta + R_i\alpha) \text{ for } s = 0, \dots, 9 \quad , \quad (10)$$

where the vector x_i (taken from 2013 LiK data) includes the age women, marital status, whether the first two births are boys, whether the first two births are girls, the number of elderly in the household, whether the respondent is responsible for elderly care, income from property, remittances and social transfers including income from pension monthly transfer, unified monthly transfer and social monthly transfer (omitted category is labour earnings); education level of the woman (omitted category is secondary education); R is a vector of dummy variables indicating location (omitted category is Issyk-Kul oblast).

The estimates of the Cox proportional hazard model are presented in Table 7. Model 1 describes the effect of employment on birth spacing without social transfers. Employment status reduces the relative risk of birth by 8.4 percent.¹³ The age and age squared of woman are highly significant and the relative hazard of birth is concave function of age. Marital status positively affects birth spacing. Prior birth history variables, whether the first two birth were boys affect negatively on relative risk of having birth. However, where the first two births are girls is highly significant and positively affect on relative risk of birth. It increases the relative risk of birth by 14.5 percent.¹⁴ This fact confirms the traditional culture of preferring the boy as an inheritor. Another variable related to the composition of the household is the number of elderly. The number of elderly in the household reduces the relative hazard of birth by 17.8 percent.¹⁵ Only, the location in Bishkek relative to Issyk-Kul oblast affects significantly negative on the relative risk of birth. Women with only primary education show a higher relative (to women with secondary education) risk of having birth

¹³ $(1 - \exp(-0.0876)) = 0.0838$.

¹⁴ $(\exp(0.135) - 1) = 0.1445$

¹⁵ $(1 - \exp(-0.196)) = 0.1779$

by 19.5 percent.¹⁶ Women with tertiary education relative to secondary education are having relatively low risks of birth.

Table 7 Cox proportional birth hazard model stratified by parity		
VARIABLES	(1)	(2)
Employed	-0.0876* (0.0475)	-0.0632 (0.0486)
Age	-0.312*** (0.0392)	-0.339*** (0.0401)
Age squared	0.00374*** (0.000570)	0.00415*** (0.000585)
First two boys	-0.0409 (0.0513)	-0.0196 (0.0515)
First two girls	0.135*** (0.0504)	0.136*** (0.0514)
Married	0.0352 (0.0487)	0.0381 (0.0509)
Care of elderly	0.0378 (0.0679)	0.0592 (0.0701)
Number of elderly	-0.196*** (0.0372)	-0.160*** (0.0530)
Pension transfer		-9.48e-06 (1.05e-05)
Social assistance transfer		0.000186*** (4.80e-05)
Social monthly transfer		-0.000117 (7.37e-05)
Property income		9.83e-07 (9.78e-06)
Remittances		-1.77e-06 (3.39e-06)
Primary education	0.178*** (0.0665)	0.206*** (0.0691)
Tertiary education	-0.131** (0.0534)	-0.115** (0.0547)
Jalal -Abad	0.0271 (0.0766)	-0.0139 (0.0762)
Naryn	0.0964 (0.109)	0.0283 (0.112)
Batken	0.0244 (0.0975)	-0.00173 (0.0987)
Osh	0.0344 (0.0779)	0.00652 (0.0764)
Talas	0.0322 (0.0991)	-0.000879 (0.0987)
Chui	-0.0359 (0.0793)	-0.0532 (0.0808)
Bishkek	-0.243*** (0.0891)	-0.267*** (0.0907)
Osh city	0.00140 (0.114)	0.0124 (0.112)

¹⁶ (exp(0.178)-1=0.1948)

Observations	4,681	4,515
Robust standard errors in parentheses	*** p<0.01, ** p<0.05, * p<0.1	

Model 2 includes variables capturing social transfer income. Living in households receiving remittances reduces the relative risk of birth significantly. Income from social assistance transfers significantly increase the relative risk of birth among low-income women, while income from pensions reduce the relative risk of birth but by only by a negligible amount.

7. Conclusion

Relying on data from the LiK survey 2010-2013, this paper examined whether social transfers are influence the labour supply decisions of women in Kyrgyzstan. In the introduction we offered two justifications for the focus of this paper. First, it addresses a concern with relatively low and stagnant rates of labour force participation of women in Kyrgyzstan, and more broadly FSU countries. Low rates of labour force participation by women are an important indicator of economic inclusion, productivity, and growth, with implications for poverty and human capital investment. The literature points to a decline in labour participation by women since the transition. Second, social policy has lagged behind economic transformation in FSU countries. Social transfers remain strongly focused on supporting groups considered to be vulnerable due to their weaker labour market engagement. Social transfers in Kyrgyzstan are predominantly pro-old and maternalist. This approach made sense in the context of full employment guarantees, but needs adapting to economic liberalisation. In particular they need adapting to the presence of unemployment, underemployment, and informality. In this context, examining the potential influence of social transfers on the labour supply of women helps to throw light on the extent to which social policy and social transfers are adapting successfully to the new conditions.

The recent evolution of social transfers in Kyrgyzstan reflects tentative efforts to re-purpose the relevant policies and institutions. Recent social policies, and economic conditions, have led to an expansion of social transfers. Public subsidies in the shape of social transfers presently absorb 5.7 percent of GDP. Transfers to pensioners account for the best part of this budget. Social assistance transfers to families in poverty with children have also expanded in the last few years. The LiK data shows a rapid increase in the share of the population receiving social assistance transfers from just above 2 percent in 2010 to over 6 percent in 2013. These transfers appear to be effective in reaching the relevant population and in reducing poverty among families with children (Gassmann & Zardo Trinidad, 2015).

Analysis of the LiK data confirms that social transfers matter for the labour supply decisions of adult women. Distinguishing between pension transfers (social insurance) and transfers to poorest families with children (social assistance), the analysis in the paper finds that pension transfers are associated with lower probabilities of participation and fewer hours

among adult women aged 18-60. The association between social assistance transfers and labour supply decisions by women is significantly weaker across years. Estimates for earlier years show some correlation between social assistance transfers and lower probabilities of participation and fewer hours of work among adult women, but this association disappears in later years, when the reach of the transfers, as observed in the data, was expanding. Panel estimates show more robust and significant association of pension transfers and labour supply decisions by women and more precise, but still weaker, correlation existing between social assistance transfers and women's labour supply.

The analysis in the paper cannot throw light on causality. Regarding social assistance transfers, a negative correlation could be explained by a response to the transfers or alternatively by the fact that transfer are targeted on low-income households with children.

In line with theory and expectations from related studies, the analysis in the paper finds that care responsibilities are a very significant influence on women's labour supply in Kyrgyzstan. The paper explored the potential influence of social transfers on birth spacing, as a means to link up social transfers, labour supply decisions, and fertility decisions. Our analysis of birth spacing found that women in households benefiting from social assistance have a marginally higher risk of birth than other women at the same parity.

The findings highlight the need for data and further research on the linkages between fertility and labour supply decisions on the one hand and social transfers on the other. The findings on the strong negative association between pension transfers and the labour supply of working age women is another important area for further research. Future research will need to throw light on whether the links work through care responsibilities, pension income, or a mix of both.

The analysis in the paper does not find conclusive evidence to argue that social assistance transfers (Monthly social transfers for poor families with children) are responsible for women's low labour force participation. It does contribute some evidence that social assistance transfers is failing to facilitate the employment of adult women in low-income households. From a perspective of maximising the effectiveness of social transfers in addressing poverty and low-incomes, a more welcomed finding would correlate social assistance transfers with rising labour market participation among women in participant households. This would be an indication that social transfers facilitate economic inclusion in low-income households. From this perspective, policy makers need to give further consideration to the maternal bias in social assistance transfers.

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