Youth Wage Subsidies

Technical Report for the Youth Employment in sub-Saharan Africa Toolkit

Technical reports are intervention-specific summaries based a review of relevant studies from sub-Saharan Africa contained in the Youth Employment Evidence and Gap Map (EGM). This report is prepared by Howard White, The Research and Evaluation Centre. The meta-analysis was performed by Nina dela Cruz, Centre for Evidence-Based Social Sciences, Lanzhou University.

About this technical report

This technical report is one of a series of technical reports being produced to document the evidence base for interventions to increase youth skills and employment in sub-Saharan Africa. The report is based on relevant studies for sub-Saharan Africa contained in the Youth Employment Evidence and Gap Map (EGM).

The purpose of this report is to inform the content of the What Works for Youth Employment in Sub Saharan Toolkit. This report provides results from both the quantitative evidence from impact evaluations and the qualitative evidence from process evaluations. The former are the basis for the impact rating and the latter the lessons from implementation. The critical appraisal of the studies, which was undertaken for the EGM, provides the basis for the confidence in study findings.

Table of contents

List of tables

List of figures

Abbreviations

EGM	Evidence and Gap Map
ETI	Employment Tax Incentive
OR	Odds Ratio
PAYE	Pay As You Earn
RCT	Randomized Controlled Trial
SMD	Standardized Mean Difference

Plain language summary

What is this report about?	This technical report looks at the evidence in English on the effects of wage subsidies on skills, employment and earnings for young people in sub-Saharan Africa.
What are wage subsidies?	Youth wage subsidies are a payment made to, or claimable by, the employer for the employment of young people. Wage subsidies usually cover a proportion of the wage and non-wage costs for eligible employees, not the whole cost. They are for a limited duration.
In what context are wage subsidies implemented?	Wage subsidies are provided to formal sector firms, and so are most applicable where there is a sizeable formal sector, which is likely to be in urban areas.
What are the main design choices?	There are many design choices to be made for a subsidy scheme, such as the size and duration of subsidy, who receives the subsidy, the delivery mechanism, and the eligibility criteria. For the programme to be effective it is also important that employers and potential employees know about, understand and trust the programme.
How are wage subsidies expected to work?	The economic argument for wage subsidies is that employers do not know the productivity of young people, and so are not willing to pay them the going wage, especially if there is a minimum wage which is above the perceived value of the young person's marginal product. Providing a subsidy lowers the cost of hiring the worker. More permanent employment can result from the employer observing the young person's productivity, and as the young person acquires skills and experience during the period of subsidized employment. There are possible disadvantages of a wage subsidy, notably subsidizing a worker who would have been employed anyway, displacing an existing worker and creating unfair competition with other workers and other firms.
What sort of activities do wage subsidies support?	Wage subsidies provide a subsidy conditional upon employing a young person. There will be monitoring that these and other conditions are met. There may be a training requirement for subsidised workers.

Implementation issues	Many employers say they will not use the subsidy partly because of the administrative burden.
The effects of wage subsidies	Although the South African voucher experiment showed a modest improvement (7%) in wage employment, evaluations of the programme at scale (ETI) are less promising. Meta-analysis of seven studies finds a small effect equivalent to an increase in employment of less than 3%.
Cost analysis	Wage subsidies are unlikely to be cost effective in sub-Saharan Africa because of small effects and large administrative costs.
How strong is the evidence base?	Confidence in study findings is low because of low confidence on the included studies (and small number of studies for earnings). There are impact evaluations of just three programmes: eight studies of a subsidy in South Africa, and one of the pilot for that programme, and one for a programme in Côte d'Ivoire. There are no process evaluations.
Implications for research	Long-run studies of existing subsidy schemes would be useful. It would also be useful to strengthen the evidence base, researchers should pay attention to issues which reduce confidence in study findings, such as the lack of a priori power calculations, and reporting of attrition.
Implications for policy and practice	Based on experience to date, youth wage subsidies do not appear to be a suitable policy intervention in sub-Saharan African countries at present.

What are youth wage subsidies?

Youth wage subsidies are a payment made to, or claimable by, the employer for the employment of young people. Wage subsidies usually cover a proportion of the wage and non-wage costs for eligible employees, not the whole cost.

The subsidy may be a direct payment to the employer, or a reduction in payroll tax or social security contributions. Alternatively, the subsidy may be paid to the employee, though this is less common.

The **subsidy is usually available for a limited duration**.

This technical report does not include start up grants for youth to start their own business ('starter kits'). Training stipends are also not included under this heading.

Youth wage subsidies are not common in sub-Saharan Africa, with studies from just two countries: Côte d'Ivoire and South Africa.

How are youth wage subsidies expected to work?

The economic argument for wage subsidies is that employers do not know the productivity of young people, and so are not willing to pay them the going wage, especially if there is a minimum wage which is above the perceived value of the young person's marginal product. **Providing a subsidy lowers the cost of hiring the worker**. See Almeida et al. (2014) for a presentation of the case for wage subsidies in developing countries.

Whilst a subsidy provides a temporary incentive to employ a young person, the primary outcome of interest is continued employment after the subsidy period. A secondary outcome is skills and experience.

Once employed, two mechanisms improve the young person's employability: (i) the employer learns the young person's productivity, and (ii) the young person acquires skills and experience. Given also the transaction costs of hiring someone else, the employer is likely to keep the employee once the subsidy ends. If they do not, the young person has acquired skills to obtain another job.

These mechanisms provide a rationale for the subsidy only being of limited duration, with a reasonable expectation that employment will be sustained once the subsidy ends. Theory does not give an indication of the optimal duration of the subsidy. It is likely that a shorter time is needed to indicate the worker's productivity than is needed for skills acquisition.

In addition, the subsidy allows the young person to access a job which may put them on a good career path rather than having to accept a 'dead end' job.

These **benefits of the wage subsidy may be fully or partially offset** by the following:

- **Deadweight loss:** employers hire workers who would have been hired anyway in the absence of the subsidy.

- **Substitution or direct displacement effect:** another worker is laid off - or not hired – because of the subsidised worker.

- **Unfair competition or indirect displacement:** firms with subsidised workers have lower costs and so can reduce prices, so that competitors have to lay off employees.

- **Forgone education:** Young people may be attracted to enter the labour market prematurely rather than remain in education or full-time training, thus exchanging the short-term benefit of wage income now for higher income in the future.

What are examples of youth wage subsidies in sub-Saharan Africa?

Wage subsidies are common across Europe: there are 60 studies of youth wages subsidies in Europe in the Youth Employment EGM. In contrast **there are just 10 studies from sub-Saharan Africa, most of which concern the same policy in South Africa (the Employment Tax Incentive**).

This technical report is based on ten studies of three interventions. These studies are all impact evaluations (see Table 1). One study (Levinsohn et al., 2014) was of a youth wage subsidy experiment in South Africa, which was the precursor for the introduction of a national youth wage subsidy through a tax incentive which is the subject of eight studies. The final study is of a subsidised apprenticeship in Côte d'Ivoire.

Table 1: Examples of youth wage subsidies

The *Employment Tax Incentive (ETI), South Africa*, introduced in 2014, provides tax reductions to firms for the wages paid to young workers aged 18-24. The subsidy amounts are periodically revised. Currently, for youth on the minimum wage, a subsidy of 75% is paid in the first year of employment and 37.5% for the second year. An additional flat rate amount is available if a higher monthly wage is paid up to R6,500 (USD1,730). Only private sector firms are eligible. The youth must be paid at least the minimum wage, but below a set threshold. Studies of ETI include Aflagah (2020), Ebrahim and Pirttilä (2019 and 2022), and Woldemichael, Hammed, and Fadiran (2023).
A *youth wage subsidy in South Africa* was run in 2010 to test youth response to a wage subsidy to inform discussions for the proposed national wage subsidy (ETI, see above). The study was a randomised controlled trial in which 1,196 youth were assigned a voucher to hand to their employer who could claim cash equivalent to 50% of wage costs (Levinsohn et al., 2014).
The *Emergency Youth Employment and Skills Development Project (PEJEDEC) in Côte d'Ivoire* included an apprenticeship programme which provided both theoretical and on-the-job training. The apprenticeship involved on-the-job training by a senior craftsperson, who was either a company owner or an experienced employee. The programme began in an lasted 12 or 24 months depending on occupation during which the young person received a monthly subsidy equivalent to US$54 . The programme was implemented by 341 firms in seven urban areas, reaching 1,832 low-skilled youths aged between 18 and 24.

Design choices for wage subsidy programmes

Design choices faced in designing a wage subsidy include:

- **Who gets the subsidy**? The subsidy may be paid to either the employer or the employee.

- **Who are the target group (eligibility criteria)**? The target group usually specifies an eligible age range, e.g. 18-24 years, and that they are currently unemployed.

- **How are the target groups identified?** Identification may be made using administrative data, especially if eligibility is based on months claiming benefits or out of education, but may also involve self-identification.

- **Who are the eligible firms?** Schemes may restrict eligibility to private sector firms, sometimes including non-profits. Less commonly, public sector entities are also eligible.

- **How is the payment affected?** If payment is made to the employer it can be a direct payment to the employer, or a reduction in social security contribution or payroll tax. If given to the youth it may be paid as an in-work benefit (i.e. a cash subsidy), or a voucher which is then redeemed by their employer.

- **Who implements the programme?** The most common implementing agency is the public employment service, but it may be taken on by local authorities or the Ministry of Finance (or Treasury). The implementer will need to work in partnership with others.

- **How do intended beneficiaries and employers know about the programme?** The public employment service will usually provide options to unemployed young people which will include information about the wage subsidy. Employers can be reached through employers' associations such as Chambers of Commerce. The public

employment service may also match eligible young people with advertised vacancies and notify the employer of the availability of the subsidy.

- **How large is the subsidy?** Subsidies are not usually for the whole wage cost. They are typically around 50%, possibly capped at 50% of the minimum wage. A larger subsidy may be paid for more disadvantaged youth, and an additional payment to cover training costs.

- **What should be the duration of the subsidy?** Wage subsidies are of limited duration, most commonly 6-12 months.

- **What conditions should be attached to the subsidy?** The most common condition is that the young person has to still be employed at the end of the subsidy period. Some schemes only pay out at the end of the period as an enforcement mechanism. There may also be conditions of retaining the young person for a certain time after the subsidy, otherwise the subsidy has to be repaid, and that the company increases its employment when taking on the subsidised worker. There may also be conditions linked to training provision. 'Intergenerational' subsidy programmes provide a subsidy for an older worker conditional upon also hiring a young person, possibly with the former providing training or mentoring to the latter.

- **Should three by a training requirement?** may be required to be provided for the subsidised worker which may be either on the job or in a training centre.

- **How will the subsidy be funded?** It may be funded from general taxation, but may also be funded from a levy on larger firms, as is the case with the Apprenticeship Levy in the United Kingdom.

- **What monitoring and enforcement of conditions should there be?** To be effective conditions need to be monitored, ideally with an enforcement mechanism for non-compliance.

What has been the implementation experience of wage subsidies?

For a wage subsidy scheme to be effective employers and potential employees should be aware of it, understand if they are eligible and understand the application procedures. Furthermore, the application procedure should not be unduly burdensome, and reimbursement made in a timely manner if employers are expected to use the scheme more than once. There are no process evaluations of wage subsidies, but some evidence of implementation is presented in one study (Levinsohn et al., 2014), and we draw on one study of business perceptions (De Jongh et al., 2016).

Some evidence on these issues is presented by Levinsohn et al. (2014) who examine the trial in South Africa in which 1,196 youth were assigned a voucher to hand to their employer who could claim cash equivalent to 50% of wage costs. Nearly one half of the youth (45%) did not try to use the voucher at all. This is partly explained by the fact **that over one third of the youth (36%) did not understand how the voucher was meant to work.**

Of the 611 youth who approached a firm with the voucher, 194 obtain wage employment. However**, just 22 firms (that is 11%) actually claimed the subsidy**, and an additional 16 firms made an enquiry about the subsidy. Several reasons were given for not claiming the subsidy. Some thought **the administrative burden was too great**. In larger firms HR departments did the hiring, and claiming the subsidy was not their responsibility. In some cases, the young person did not find an opportunity to hand over the voucher. And some employers doubted the validity of the voucher.

A survey of business perceptions of ETI found that the large majority of employers (92%) supported the scheme. But they were sceptical of its impact as other factors influenced hiring of youth such as their lack of skills, a lack of trust in public sector schemes, and other labour regulations they would have to contend with (De Jongh et al., 2016).

Overall confidence in findings – meaning the extent to which these findings apply more generally – is low because of the small number of studies.

The effects of youth wage subsidies

The evidence of effects comes from studies of three interventions, two implemented by the Treasury South Africa and one as part of a project in Côte d'Ivoire.

The wage subsidy experiment in South Africa was conducted by the Treasury. Under the experiment youth, who had to be South African citizens aged 20-24, were given a voucher which they could hand to their employer who could then claim a subsidy of 50% of wage or R833 a month, whichever was lower. The subsidy was available for at least six months, and continued thereafter until a R5,000 subsidy had been paid out for the employee in total. **The study of this scheme (Levinsohn et al., 2014) found that youth with the subsidy were 6% more likely to be in wage employment, and there is no evidence of any displacement** (see Table 2).

The success of the experiment supported the decision by the Treasury to introduce the Employment Tax Incentive (ETI) in 2014 by which firms could receive tax reductions to firms up to the value of 50% of the wage bill for young workers (the subsidy has varied over time, see Table 1 for the most recent figures). The conditions when the programme started were that:

- The youth employees must be between 18-24 years old, not related to the employer and have a valid South African ID.
- They were paid at least the minimum wage but less than R6,000 per month.
- The firm could not fire an older worker for the tax incentive.
- The firms had to be in the private sector.
- The firm could not owe any money to the South African Revenue Service, and had to be registered for Pay-As-You-Earn (PAYE).

Most studies of this tax incentive find little or no effect on employment. Where there is an effect it is small (see Table 2). Most studies also find no evidence of displacement, though there is one exception (Woldemichael, 2023). Two of the studies report that the

employment effect is concentrated in small firms, see Ebrahim (2017) and Woldemichael (2023).

Table 2: Studies of youth wage subsidy programmes in sub-Saharan Africa

Study	Design	Findings
Wage subsidy voucher, South Africa (pilot study supporting adoption of ETI)		
Levinsohn et al. (2014)	Randomized control trail	There was no effect on labour force participation, but there was an increase in wage employment. Those in the voucher group were 6.3% more likely to be employed one year after the voucher was distributed. Few firms actually claimed the voucher, but for those who did the person was more likely to remain in employment.
Employment Tax Incentive (ETI), South Africa		
Aflagah (2020)	Difference-in-difference Treatment: 5 years below age cut off Control: 5 years above age cut off	Small, insignificant effect of less than 1% on employment and labour force participation. Effects were small (and possibly negative) for women. The results were not affected by race or education. There was no evidence of job reallocation.
Bhorat et al. (2020)	Difference-in-difference with propensity score matching	Statistically significant but small effect on employment during a time when employment was falling. ETI firms only lost between 0.51 and 0.66 jobs on average compared to 1 job in non-ETI firms. This translates to a total of 35,333 jobs saved between 2014 and 2016. Small firms of fewer than ten employees have experienced the most benefit from the ETI. The effect of the ETI seems to be declining over time. There is no evidence of displacement.
Budlender (2021)	Conditional difference-in-difference	Positive effect on employment but suggests that difference-in-difference is not valid as parallel trends not met.
Ebrahim (2017)	Difference-in-difference	Overall, no statistically significant impact on employment, but there was a positive and statistically significant effect on the youth and non-youth employment in firms with fewer than 200 employees
Ebrahim (2019)	Triple difference	The number of jobs for lowest paid workers has increased, but the increase is not statistically significant. In addition, the earnings seem to have increased for part of the eligible group, suggesting that the incidence is partly on workers.

Ebrahim (2022)	Triple difference	There is no overall effect on employment, though significant effects of a 4 percentage point increase are found on employment for women and earnings of 6 percentage points for men.
Moeletsi (2017)	Difference-in-difference	The employment of young workers rose by around 2% compared to the no subsidy counterfactual.
Ranchhod (2015)	Difference-in-difference	ETI did not have a substantial positive effect on aggregate youth employment probabilities during its first year of existence.
Woldemichael (2023)	Difference-in-Difference	There was an increase of 0.003 probability points (0.03%) higher of hiring youth in the 18-24 age bracket. However, there is a significant reduction in both hiring and separation rates for workers in the 24-44 age range, suggesting some displacement. The positive effects on employing younger workers are driven by small firms.
Dual apprenticeship programme, Côte d'Ivoire		
Crépon and Premand (2018)	Randomized control trail	Individuals in the treatment group are less likely to be employed or self-employed, and are more likely to become apprentices. Overall, the programme has no short-term effects on total youth earnings. Labour earnings fall by 25%, while non-labour earnings rise by 135%. The average hourly labour earnings of apprentices in the treatment group are significantly lower than those of apprentices in the control group.

Meta-analysis is a method for calculating the average effect from a range of different effect sizes. The average effect is commonly reported as a standardized mean difference (d), which is the difference in the mean in outcomes between treatment and control, divided by the standard deviance of the outcome. Rather than d we report g, which includes a small adjustment to d to account for bias in small samples.

The meta-analysis of the South African studies finds a very small effect on employment (SMD, g=0.04), with a similar, statistically insignificant effect, on earnings (g=0.04); see Table 3 and forest plots in Annex 1.

Table 3: Meta-analysis of South African wage subsidy studies

Statistic	Employment	Earnings
g	0.04	0.04
95% Confidence Interval	0.01-0.06	-0.01-0.09
No. of included effect sizes	10	4

The employment effect is equivalent to a 3.6 percentage increase (see Annex 2). The number needed to treat is 55. That is for every 55 subsidized positions one job is created that would not have existed otherwise. **This means that youth wage subsidies are likely not cost effective given the administrative costs of the scheme.**

The other study is of a dual apprenticeship programme in Côte d'Ivoire. The programme provided both theoretical and on-the-job training. On-the-job training was provided by a senior craftsmanship, who was either the owner or an experienced employee. The programme lasted 12 or 24 months depending on the occupation during which the young person received a monthly subsidy equivalent to US$54 after they signed a contract with the implementing agency. The programme was implemented by 341 firms in seven urban areas, reaching 1,832 low-skilled youths aged between 18 and 24. The youth had to be able to read and write.

The study found that apprentices earned less than the control group who did not have apprenticeships (Crépon and Premand, 2018). However, four years after the apprenticeships, apprentices were earning 15% more than youth in the control group (Crépon and Premand, 2019).

The overall confidence in study findings is low on account of low confidence in the included studies, and the small number of studies reporting the effect on earnings.

Cost analysis

None of the studies of the South African subsidy report an analysis of cost effectiveness. However, the effects are low, and high administrative costs are mentioned, so **it is unlikely that wage subsidies are cost effective.**

The study of Côte d'Ivoire finds that subsidised apprenticeships may be cost-effective, but then caveats that view because of negative, offsetting effects.

Implications of study findings

Wage subsidies are not common in sub-Saharan Africa, with most studies being of a scheme in South Africa, and one study of the pilot for that intervention. There is at best a small impact of wage subsidies on employment and earnings. The administrative burden and lack of knowledge about the scheme discourages employer engagement.

Implications for policy and practice

Wage subsidies have at best a small impact on youth employment and income in the sub-Saharan African context. The administrative requirements deter many firms from applying for the scheme. Most countries in sub-Saharan Africa have small private formal sectors and a limited tax base. The administrative capacity to implement a wage subsidy is also quite demanding. Hence, although such subsides are common in developed countries, they do not seem suitable at present in sub-Saharan Africa. Further research on pilot schemes may change this conclusion.

Implications for research

The overall assessment of confidence study findings is low because of the limited number of studies. And none of the included studies assess the effect on skills. Better conducted and reported studies with a wider range of outcomes would allow a more comprehensive assessment of wage subsidies.

There are no long-run studies of these existing subsidy schemes. Such studies would allow a more robust conclusion as to the suitability of the intervention.

References

Aflagah K. (2020). Failed Promises of a Wage Subsidy: Youth and South Africa's Employment Tax Incentive. College Park: p.48. Available at: http://econweb.umd.edu/~aflagah/files/Kodjo_JMP.pdf

Almeida, R., Orr, L. and Robalino, D. (2014). Wage subsidies in developing countries as a tool to build human capital: design and implementation issues. IZA J Labor Policy 3, 12 (2014). https://doi.org/10.1186/2193-9004-3-12

Bhorat, H., Hill, R., Khan, S., Lilenstein, K. and Stanwix B. (2020). The Employment Tax Incentive Scheme in South Africa: An Impact Assessment. Cape Town: University of Cape Town (Development Policy Research Unit). Available at: https://www.africaportal.org/publications/employment-tax-incentive-scheme-south-africa-impact-assessment/" https://www.africaportal.org/publications/employment-tax-incentive-scheme-south-africa-impact-assessment/

Borenstein, M., Hedges, L, Higgins, J. and Rothstein H. (2009). *Introduction to Meta-Analysis.* Chichester: Wiley.

Budlender, J. and Ebrahim, A. (2021). Estimating employment responses to South Africa's Employment Tax Incentive. The United Nations University World Institute for Development Economics Research (UNU-WIDER). Available at: blob: https://eppi.ioe.ac.uk/749807c2-9d65-4123-9b49-31d41b932683

Crépon, B. and Premand, P. (2018). Creating new positions? direct and indirect effects of a subsidized apprenticeship program. Washington D.C.: World Bank. Available at: https://openknowledge.worldbank.org/entities/publication/b5d1e6c5-fe0a-5fea-8eb3-e098334638a9

Crépon, B. and Premand, P. (2019). Direct and indirect effects of subsidized dual apprenticeships. IZA Discussion Papers, No. 12793. Institute of Labour Economics. https://www.iza.org/publications/dp/12793/direct-and-indirect-effects-of-subsidized-dual-apprenticeships

De Jongh J.J., Meyer, N. and Meyer, D.F. (2016) Perceptions of local businesses on the Employment Tax Incentive Act: the case of the Vaal Triangle region *Journal of Contemporary Management* Vol 13: 409:432.

Ebrahim, A., Leibbrandt, M. and Ranchhod, V. (2017). The effects of the Employment Tax Incentive on South African employment. Helsinki: World Institute for Development Economic Research (UNU-WIDER). Available at: https://www.wider.unu.edu/publication/effects-employment-tax-incentive-south-african-employment

Ebrahim, A. and Pirttilä, J. (2019). Can a wage subsidy system help reduce 50 per cent youth unemployment? Evidence from South Africa. Helsinki: WIDER Working Paper. Available at: https://www.econstor.eu/bitstream/10419/211258/1/1662497024.pdf

Ebrahim, A., & Pirttilä, J. (2022). *A policy for the jobless youth in South Africa: individual impacts of the employment tax incentive* (No. wp-2022-124). World Institute for Development Economic Research (UNU-WIDER). https://www.wider.unu.edu/sites/default/files/Publications/Working-paper/PDF/wp2022-124-policy-jobless-youth-South-Africa-individual-impacts-Employment-Tax-Incentive.pdf

Levinsohn, J., Rankin, N., Roberts, G. and Schöer, V. (2014). A youth wage subsidy experiment for South Africa. New Delhi: International Initiative for Impact Evaluation (3ie), pp.78. Available at: https://www.3ieimpact.org/sites/default/files/2019-01/ie15-youth_wage_subsidy.pdf

Moeletsi T (2017). South Africa's youth unemployment and the employment tax incentive: an empirical re-evaluation. University of the Witwatersrand, Johannesburg, Available at: https://wiredspace.wits.ac.za/handle/10539/27665

Moeletsi, T. (2018). *South Africa's youth unemployment and the employment tax incentive: an* empirical re-evaluation (Doctoral dissertation).

Ranchhod, V. and Finn, A. (2015). Estimating the Effects of South Africa's Youth Employment Tax Incentive – An Update. Southern Africa Labour and Development Research Unit, University of Cape Town. Available at: https://econpapers.repec.org/paper/ldrwpaper/152.htm

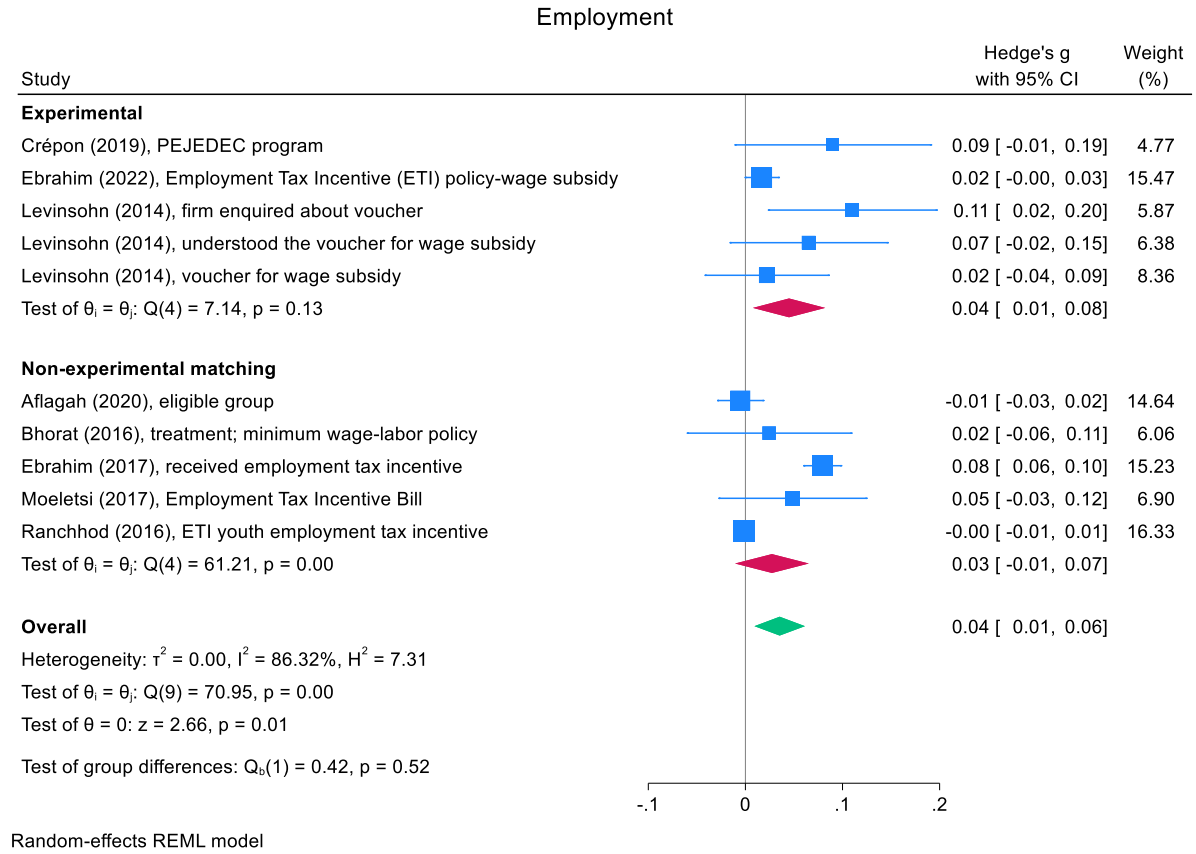
Woldemichael, A., Hammed, A. and Fadiran, D. (2023). Mom-and-Pop Jobs: Wage Subsidies and Youth Unemployment in South Africa. SSRN id4350146.

Annex 1 Results of meta-analysis

This annex presents the forest plots from the included studies for this report. Each horizontal line in a forest plot shows the 95% confidence interval for Hedges' g for a specific study, with the meta-analysed effect size represented by the diamond at the bottom of the figure. If the horizontal line crosses the vertical line then that study finds no significant effect.

The I^2 and Q statistic are measures of heterogeneity, that is the extent of variation in effect sizes between studies. Where there is substantial variation (as in Figure A1.1), then it is useful to conduct further analysis to understand the sources in that variation. One source is that the study of the RCT (Levinsohn et al., 2014) is of the pilot, which generally has larger effects than the studies of the scaled-up tax incentive. The largest effect comes from Moeletsi (2017) who used difference-in-difference with no matching, and so likely has some selection bias.

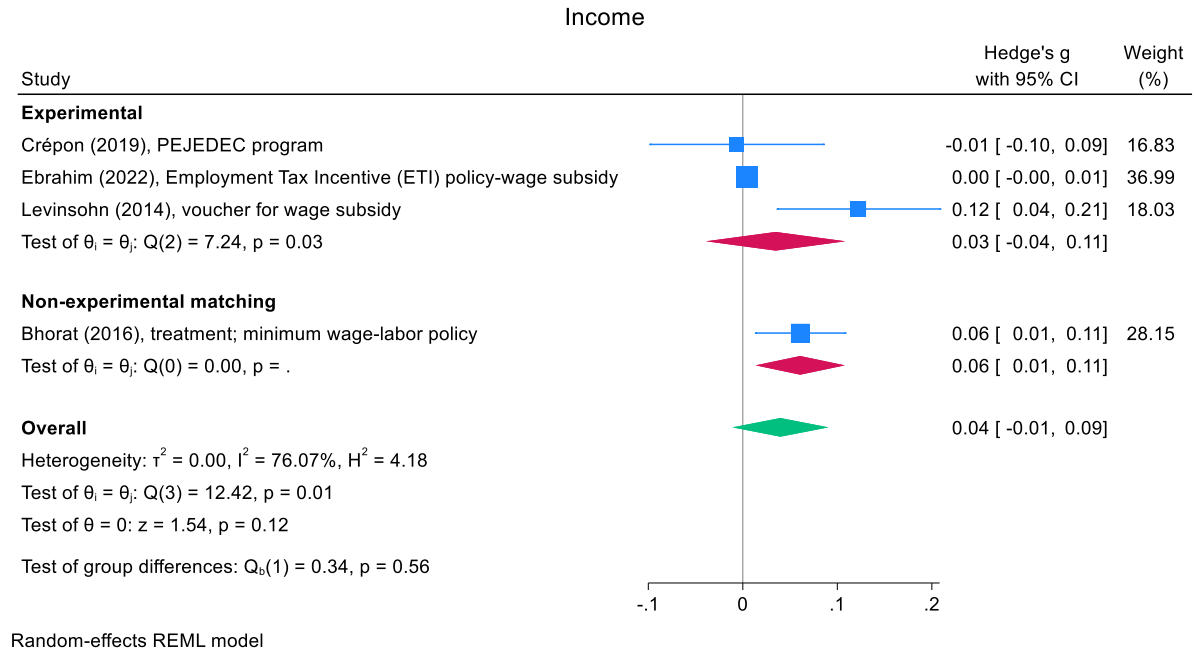
Figure A1.1: Effect of youth wage subsidy on employment



Source: Authors' calculations

Notes: CI = confidence interval; p = prob value. I^2, H^2; τ^2, and Q are all measures of heterogeneity. Test of Θ=0 is a test that none of the effect sizes are significantly different from 0, and z the significance test for that statistic. See explanation of figure in the text.

Figure A1.2: Effect of youth wage subsidy on earnings



Source: Authors' calculations

Notes: CI = confidence interval; p = prob value. I^2, H^2; τ^2, and Q are all measures of heterogeneity. Test of Θ=0 is a test that none of the effect sizes are significantly different from 0, and z the significance test for that statistic. See explanation of figure in the text.

Both Figures A1.1 and A1.2 show a small overall effect. By convention a d (or g) of less than 0.2 is considered small. Even with a lower threshold of 0.1, which is more applicable to economic interventions, the average effect is still well below the threshold.

Annex 2 Calculation of meaningful effect sizes

The standardized mean difference (SMD) can be converted to an odds ratio (OR) using the formula $lnOR = \frac{g\,\pi}{\sqrt{3}}$ (Borenstein et al., 2009). Using the OR a 2x2 table can be created, for which we need an assumption of the share of the control group gaining employment. We assume 50%. We also need to assume the sample size for treatment and control, though the result is not sensitive to that assumption. We assume 100 in each group. With g=0.04, OR=1.08. This gives the 2x2 table:

Table A2.1: 2x2 table to calculate percentage change in employment

	Employed	Unemployed	Total
Treatment	51.8	48.2	100
Control	50	50	100
Absolute % change		1.8	
% change (cf comparison rate)		3.6%	
No. need to treat		55	

The number needed to treat is calculated as the number treated divided by the absolute difference in employment between treatment and control groups.

Annex 3 Critical appraisal

Critical appraisal assesses the confidence we can have in study findings, being classified as high, medium or low. The results of the critical appraisal inform the overall confidence we have in the findings reported in the technical report.

Table A3.1: Critical appraisal of included studies

	Thread	Study Design
Aflagah (2020)	Medium	Impact
Bhorat (2020)	Low	Impact
Budlender (2021)	Low	Impact
Crepon (2021)	High	Impact
Ebrahim (2017)	Low	Impact
Ebrahim (2019)	Low	Impact
Ebrahim (2022)	Low	Impact
Levinsohn (2014)	Medium	Impact
Moeletsi (2017)	Low	Impact
Ranchhod (2015)	Low	Impact
Woldemichael (2023)	High	Impact

Confidence rating for meta-analysis effect sizes decision rule

The overall assessment of confidence in an effect size reported in the technical report is derived from the following table

Table A3.2: Threshold values for critical appraisal

		No. of included studies for effect estimate		
		5 or less	6-9	10 or more
Overall assessment	Mainly Low	Low	Low	Low
	Medium	Low	Medium	Medum
	Mainly High	Low	Medium	High

Mainly low = At least 60% of studies are rated low

Mainly high = At least 60% of studies are rated high

Medium = any estimate not covered by the above two categories

Adjustment for heterogeneity: reduce by one level if $I^2 > 80\%$

Application to this report

There are seven reported effect sizes for employment, of which five are low confidence, and three for earnings of which two are low confidence. Hence overall confidence in study findings is low because of low confidence in the included studies (and small number of studies for earnings).

There are no qualitative studies (process evaluations) to be assessed.