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Designing for differences: aligning incentives in Tanzania's skills sector

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Acronyms and abbreviations

ATE	Association of Tanzania Employers
Cti	Confederation of Tanzania Industries
DCE	Discrete Choice Experiments
IGA	Income-generating activities
LC	Long course
NACTE	National Council for Technical Education
PCA	Principal component analysis
REPOA	Research on Poverty Alleviation
SC	Short course
SDL	Skills Development Levy
STEM	Science, technology, engineering and mathematics
TPSF	Tanzania Private Sector Foundation
TRA	Tanzania Revenue Authority
Tsh	Tanzanian Shilling
VET	Vocational education and training
VETA	Vocational Education and Training Association
WTP	Willingness to pay

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Executive summary

The existence of skills gaps and mismatches has been widely documented in several developing countries. Tanzania is no exception here. Highly subsidised vocational education and training (VET) programmes are used to address this challenge, which is social and political in nature as much as it is economical.

Since the introduction of the Skills Development Levy (SDL) in Tanzania, the financing of skills training has been contested. The private sector has raised concerns about the size of the levy and the usefulness of training provided by VET centres, and has accused the government of misallocation and misuse of the raised levy. Lack of transparency in the collection and allocation of the SDL and allegations of corruption including double taxation have been denounced. At the same time, the government has raised repeated concerns about lack of cooperation from the private sector in tackling the dramatic skills gap and youth unemployment, and has ramped up tax collection over the last five years. The government has historically experienced significant challenges in collecting taxes. Furthermore, firms have been accused of hiring foreign workers without work permits or so-called succession plans, a violation of the non-citizens employment act. This political economy of the SDL and Tanzania's skills sector has resulted in significant mistrust between the public and the private sector. To unlock this, we conducted three Discrete Choice Experiments (DCEs) over a stratified sample of 209 Tanzanian firms, looking for evidence of a feasible strategy to bring about change. This strategy builds on the idea that successful alignment of incentive structures has to take into account the heterogeneities in skills needs and the capabilities of different types of firms.

We found substantial heterogeneity in preferences (and informed choices) across firm characteristics. The main differences are evident with regard to technical capabilities, the presence (or lack) of existing training provision in-house and the size of firms. For high capability firms we find significant support for a sectoral council – hence more sector-specific skills development and joint commitment on funding – and willingness to engage with curriculum design with Tanzania's Vocational Education and Training Association (VETA), among others. Crucially, these firms are less concerned about the size of the SDL (currently 4.5% of emoluments to employees) and other incentives, which simply results in a reduction in the costs of the VET scheme. This means that this group of firms is willing to support an *incentive package that prioritises the quality of VET outcomes*, more than a reduction in the cost of the levy. In contrast, the preferences of smaller and lower tech firms appear to be significantly skewed towards an *incentive package that prioritises a reduction in the cost of the VET scheme,* while they remain indifferent to almost all other attributes. Against this background, it is clear that an incentive package that prioritises quality would crowd-in high capability firms but it would crowd-out low capability firms. If the government implemented the Incentive package prioritising Quality of VET outcomes, it will need to complement this package with further measures to crowd-in low capability firms. These measures will need to take into account the specific features of the low capability firms and address the specific challenges they face. Ultimately, it will have to offer them pathways to become more capable and contribute more to skills development.

1. Introduction

Vocational training and skills development are essential components for productivity-enhancing structural change. A competitive productive sector relies on a pool of skilled workers to build up productive capabilities. Yet the existence of skills gaps and mismatches has been widely documented in several developing countries (Lall, 2001; Amsden, 2010; Gereffi et al., 2011; ADEA, 2012; Ansu and Tan, 2012; Adams et al., 2013; AfDB and BMGF, 2015; Fox and Kaul, 2017). Tanzania is no exception here, and a substantial skills gap has been identified as a key bottleneck for productivity-enhancing structural change in the economy (LO/FTF Council, 2016). However, what is often overlooked in such analyses is that the growth of a competitive productive sector and a skilled workforce are interdependent developments – the lack of competitive productive organisations within an economy can hamper the development of experience-based technical skills.

In countries like Tanzania, the productive sector is small and highly fragmented, with a significant 'missing middle' of medium-sized companies. This results in disarticulated supply chains (Andreoni, 2019). Niches of productive competitiveness are limited to a few domestic conglomerates and foreign companies, while the rest of the productive economy operates in a semi-formal setting (Andreoni, 2017a; Cti, 2018; Andreoni and Sial, 2020). In this context, a focus on the skills gap alone without taking into consideration the capabilities of organisations that demand a skilled work force can be misleading. The reason is that both the lack of skills and the limited capabilities of the productive organisations employing these skills make for a highly heterogeneous setting where one solution does not fit all. In fact, productive organisations show considerable differences in the quantity, quality and degree of specialisation of the skills they need, with small establishments having very different skills needs than larger establishments. The latter – in general – tend to be relatively more capable in organising and deploying skills and can potentially provide experience-based technical skills for their workforce (MITI and UNIDO, 2012; Andreoni, 2018).[1]

The divergence in skills requirements between the majority of employers and a minority of strategically important firms is a challenge for the vocational education and training (VET) sector in Tanzania. In addition to the challenge of heterogeneities among the productive sector, the government faces a social obligation to tackle rising unemployment levels among the youth. Highly subsidised VET programmes are used to address this challenge by keeping youth out of the labour market for a few more years and providing them with essential skills for employment in the formal but mostly informal sector. Consequently, one of the government's primary objectives in their provision of VET are social and political, rather than solely economical.

The VET Authority (VETA) is both a provider of VET activities with its own VET centres as well as the regulatory body for the entire skills sector in Tanzania. The funding to provide for

[1] In Tanzania, the ratio of unskilled operatives is consistently higher among small and medium establishments and decreases for large ones, from 0.8 to 0.3 for mining and quarrying, and from 0.7 to 0.5 for manufacturing (Andreoni, 2018).

subsidised VET courses and VETA-owned VET centres is generated through the Skills Development Levy (SDL), which, at 4.5% of total emoluments paid to all employees per month, is relatively high in global comparisons. However, the SDL has been highly contested, with the private sector in particular having raised concerns about the size of the levy, the usefulness of the training provided by VET centres, and misallocation and misuse of the levy by the government. Specifically, on several occasions, the private sector has denounced the lack of transparency in the collection and allocation of the SDL. There have been allegations of corruption or misallocation of the SDL to fund political campaigns that VET centres prioritise social objectives over skills needs of the formal sector when designing the curriculum of heavily subsidised courses, and that centres engage in income-generating activities on the side by tapping into SDL-funded resources. The government, on the other hand, has raised repeated concerns about lack of cooperation from the private sector in tackling the dramatic skills gap and youth unemployment. Specifically, companies have been accused of hiring foreign workers without work permits or so-called succession plans, which violate the Non-Citizens Employment Act. Furthermore, while the government has ramped up tax and duties collection since 2015 (see Andreoni, 2018 for evidence), challenges in collecting taxes from large and medium size employers and establishments remain.

The political economy of the SDL has resulted in significant mistrust between the public and the private sector. Hence, despite a strong joint interest in developing skills between governments and companies, the skills sector is affected by conflicting dynamics and allegations of resource misallocations (on the public-sector side) and tax avoidance (on the private-sector side). This impasse results in skills deficiency and a low-productivity trap.

The aim of this paper is twofold. Building on Andreoni (2018), we first aim to evaluate the current incentive structures that cause existing inefficiencies and encourage rule-breaking behaviour. Second, we seek to test empirically a number of institutional design strategies for the sector that would better align the incentives of private- and public-sector stakeholders and thereby reduce misallocation of resources and increase employers' compliance with tax and labour law to overcome the low-productivity trap. We hypothesise that the successful alignment of incentive structures has to take into account the different and potential conflicting objectives of skills provision pursued by public-sector stakeholders and must also account for the heterogeneities in skills needs and capabilities of different types of productive organisations in Tanzania. We rely on in-depth stakeholder interviews and data obtained from various government sources for the first objective. For the second objective, we conduct three Discrete Choice Experiments (DCEs) complemented by a comprehensive questionnaire of a sample of 209 Tanzanian establishments. This approach enables us to uncover latent preference structures differentiated by observable characteristics of the surveyed firms.

We find substantial heterogeneity in the preferences observed across the organisations. Differences arise mainly due to diverging technical capabilities, existing training provision and the size of the establishments. Larger and more technically capable organisations prefer to be strongly involved in the design of the VET curriculum and prefer substantial parts of the SDL to be spent on sector-specific training provision. These organisations are also less concerned about the size of the levy or financial rewards for investing into skills provision,

and, in many cases, already engage in skills provision through in-house training. In contrast, smaller and less technologically and organisationally capable business enterprises prefer VETA to design the curriculum and provide training. However, these firms show some preference for subsidised courses to be shorter in duration, and for greater emphasis to be put on work experience as part of any training.

Section 2 outlines the potentially conflicting economic and social objectives pursued by the public sector in skills provision schemes and details the existing incentive structures for both private- and public-sector stakeholders in Tanzania. Section 3 describes our research method, research design and data collection. Section 4 reports on our research findings by firstly summarising information collected about the extent of skills provision among the firms surveyed and the perceived skills gap, and secondly by reporting the results of the DCEs. Section 5 concludes with a summary of our findings and policy suggestions.

2. Conflicting objectives in Tanzania's skills sector

The provision of VET schemes in Tanzania is motivated by conflicting objectives, which result in trade-offs and allocational inefficiencies in the current system. As a result, in this adverse context, rule-bending often becomes the only viable alternative to circumvent deficiencies in skills provision. However, this sows mistrust between different stakeholders. In this section, we carefully review the different objectives pursued by both private and public stakeholders to evaluate the processes and factors that are responsible for the current misalignment of interests. This analysis suggests a number of hypotheses around ways to realign these incentives, so that key objectives are met while allocative inefficiencies are reduced.

2.1. The skills gap and the institutional context

The Tanzanian economy suffers from a substantial skills gap, suggesting skills provision to be a key bottleneck for productivity-enhancing structural change. According to a report by the Danish Trade Council for International Development and Cooperation (LO/FTF Council, 2016), which is based on data from the International Labour Organization (ILO), the skills mismatch between labour supply and demand by educational attainment reached 28% in Tanzania in 2013 (with a noteworthy gap between men at 21% and women at 32%). However, the skills mismatch between job requirements and qualifications was significantly higher and reached 40% in terms of incidence of under-education and 14% of over-education. The most recent World Bank Economic Survey (2017) suggests that English language and information technology (IT) skills are the two specific types of skills that are lacking according to employer assessments. These patterns are confirmed in our survey (see section 4.1).

VET activities and services in Tanzania are run by around 520 providers and promoted under more than 30 programmes and public–private partnership (PPP) schemes (e.g. Integrated Mining Technical Training (IMTT) in the mining sector). VET providers include public VET centres (some owned by VETA, others by the central and local government), private VET centres, civil society organisations (CSOs) and non-governmental organisations (NGOs), faith-based organisations (FBOs) and private companies in the industrial sector.

VETA is both a provider of VET activities/services with its own 28 VET centres across all regions of mainland Tanzania, as well as the regulatory body for the entire skills sector. The National Council for Technical Education (NACTE) is the authority responsible for regulating technical education in Tanzania, but, unlike VETA, it does not provide any technical education and training activities/services directly. In this paper, we focus on institutional-

based VET activities, that is, those conducted in a VETA-owned VET centre or a registered, privately owned VET centre; the largest cluster of VET activities in Tanzania.[2]

VETA is funded through the SDL, which, since the fiscal year 2016–17, is charged at 4.5% of the total emoluments paid to all employees per month. Any employer with four or more members of staff must pay the SDL.[3] At 4.5%, Tanzania's SDL is significantly higher than in other countries which collect a levy, such as Kenya and South Africa, and consequently there are worries among private-sector stakeholders that this can create a competitive disadvantage and discourage formal employment. The levy is also used to support generalist training, while in both South Africa and Kenya reforms have been introduced to better tailor training to different sectoral needs.

Tanzania's existing VET centres are extremely heterogeneous with respect to their capacity, training quality, and the type of courses provided. The duration of VET courses is determined by the content of the curriculum and ranges between one and three years for 'long courses' (LCs) and from three to nine months for 'short courses' (SCs). During an LC course, trainees are scheduled to undergo practical sessions ('field attachments') in an industry for a period ranging between four and eight weeks. LCs offered by VETA-owned centres are heavily subsidised (with fees ranging between 60,000-120,000 Tanzanian shillings (TShs) annually for full board); SCs are offered by both VETA-owned and private VET centres and offer VET centres the opportunity to generate income (fees can easily reach 300,000–600,000 TShs or more).

The current VET system has been designed to satisfy a social, economic and budget objective, some of which – but not all – align with private-sector interests. The social objective arises around high youth unemployment. An estimated 850,000 young people enter the Tanzanian job market annually, but only about 50,000–60,000 formal-sector jobs are created each year. Given the limited absorption capacity of the formal sector, underemployment and informal-sector employment have seen a rising trend (LO/FTF Council, 2016).

The heavily subsidised LCs, in particular, aim to address this issue of youth unemployment by keeping young people in education for an additional two to three years and by providing skills for both formal- and informal-sector employment. LCs are also used to address other challenges arising from poor quality primary education in the country (including lack of basic numeracy skills, for example), especially for the most disadvantaged segments of society. While LCs provide a temporal fix, SCs are often preferred, especially by youth who want to establish their own, mainly informal, businesses (hairdressers, tailors, etc.).

[2] See Andreoni (2018) for more detail on other clusters and activities.

[3] Several institutions are exempt such as government departments, diplomatic missions, farm employers and educational institutions (Andreoni 2018).

2.2. Different skills needs, different training incentives

Over 97% of the Tanzanian industrial sector comprises small establishments with fewer than 10 employees. In the 2013 firm census, only 1,322 large establishments (with 10+ employees) were registered, of which 998 operated in the manufacturing sector (Andreoni, 2017). These large establishments operate in a handful of industries (mainly mining and manufacturing of food products and beverages) and are geographically concentrated in Dar es Salam and Morogoro.

While it is imperative to provide these large establishments with a skilled workforce for productivity-enhancing structural transformation to be achievable, the majority of employers have very different skills needs. Hence, the quality and type of skills developed among the workforce do not necessarily meet the requirements of large productive organisations, while at the same time there are very few firms capable of organising and deploying skills effectively. As a consequence, VETA faces very different skills requirements from the various segments of the productive sector, and existing courses tend to be geared towards the majority of employers rather than strategically important ones.

The SDL is a significant levy across tax departments in Tanzania, with the total funds collected across small, medium and large taxpayers/employers accounting for 3.26% of total domestic revenue. The SDL is collected by the Tanzania Revenue Authority (TRA) under the VET Act and Income Tax Act to promote skills development in the country. It is reported under two main departments: the Domestic Revenue Department (Direct Tax) and the Large Taxpayers Department (Direct Tax). The latter was introduced in 2001 and includes around 475 companies with a threshold of 400 million TShs in revenue. According to the revised VET Act 2006, two thirds of the SDL collected should go to the Treasury, and one third to the VET Fund. Part of the levy received by the Treasury is then allocated to the Education Fund, which was established as a basket fund for 'improvement of access, equity and quality of education' (Andreoni, 2018).

Since 2013, the allocation process for the SDL has changed. The TRA now directly transfers the SDL to the Treasury, which then allocates funds to the Ministry of Education, Science and Technology, which in turn transfers the resources to VETA, based on an agreed annual budget. The VETA budget is constructed 'bottom-up', from individual teachers to each department within a VETA centre, and then VETA centres as a whole. The budget is then reviewed and approved under each VETA zone, and is finally consolidated and approved by the VETA Head Office. While this process is still in place, since 2016 the Ministry of Finance has applied a budget ceiling of 53 billion TShs on the VETA budgets and provided projections for inclusion in VETA's five-year corporate plan.[4]

A concentration of rents in the hands of the Ministry of Finance is in part a response to worries over wasteful expenditure at the level of individual VETA centres, as well as a desire to use part of the SDL for other education-related budget items. A shift in the allocation

[4] For more details on the regulatory framework and the evolution of these budgetary processes see Andreoni (2018).

process for the levy has resulted in a reduction of resources allocated to VETA centres, which has stimulated an expansion in the provision of SCs by VETA-owned VET providers. While private VET providers charge the full economic cost plus a profit margin for their LCs, VETA centres do not make any margin on LCs. This means that only SCs offer public VET providers an opportunity for internal resource generation, which can be used to increase teachers' salaries. The margin made here is partially due to the fact that teachers who run SCs use VETA infrastructure and charge extra training materials to trainees.

SCs have proliferated in Tanzania over recent years, sometimes in response to demand from the private sector, and in some cases as a result of the existing incentive structure. Drawing on the VETA Application online platform, Andreoni (2018) finds that the portfolio of VETA-owned centres offers an average of 47% SCs, but that in some cases this provision is as high as 70% (e.g. at the Dar es Salaam Regional Vocational Training and Services Centre). Interestingly, private providers tend to offer more LCs than SCs (an average of 80% of portfolios are LCs), which indicates that the proliferation of SCs at VETA centres is predominantly driven by the prospect of revenue generation rather than demand.

The excessive use of SCs for income-generating purposes is problematic as resources funded by the SDL are used to deliver these courses, and so they potentially compete with LCs over rooms, machinery and teaching staff. Furthermore, teachers are drawn to centres that offer opportunities to deliver SCs, which thus reduces the number of qualified teachers available for the subsidised LCs. From the perspective of employers this practice has a bitter taste as many are preferring SCs for the provision of their own training needs over the subsidised LCs for which they then have to pay full fees on top of the SDL.

In 2013 VETA introduced guidelines for income-generating activities (IGA) by VET centres. Despite this important step, however, accountability of such activities is not very clear. In interviews, the VETA Department of Finance and Chief Internal Auditor were not able to provide information on the number of SCs offered by VETA centres. This means that at the central level VETA has limited capacity to assess if the income share they receive from VETA centres for IGA is correct or if resources are captured at the VETA or Zonal Board levels. Given the number of SCs offered and the relatively high fees, IGA income can be relatively high – according to the VETA statement of income and expenditure for 2012/13, IGA income reported at the central level was as high as 13 billion TShs, which is almost one third of the SDL transferred to VETA (VETA, 2014).

2.3. Problems of rents capture and heterogeneity

The governance of existing VET schemes is made particularly difficult by the fact that private organisations hardly see concrete results from their financial contribution via the SDL. In many cases, this has been imputed to a problem of rents capture. Since mid- and late 2000, companies and their representative bodies – the Association of Tanzania Employers (ATE), Tanzania Private Sector Foundation (TPSF), the Confederation of Tanzania Industries (Cti) and the Chief Executive Officer (CEO) Roundtable – have expressed dissatisfaction with the fact that the SDL is not used for vocational training only. They also reported that employers look at this situation as one of double taxation.

This claim stems from three main facts. First, the SDL is not ring-fenced and tends to disappear in the Education Fund where it complements (and is potentially a substitute for) other central budget allocations for education. Second, companies have to pay additional costs if they want to access more focused SCs for training, upgrading and/or retraining their existing workers. This is partially the result of the way in which the VETA system has evolved, where SCs are more readily available and rely on the same infrastructure as LCs. Finally, employers perceive that VETA graduates are often not ready to work and that the amount of on-the-job training that companies have to do (and fund) to compensate for this lack of readiness is another additional cost to employers. At the same time, VET centres complain about the quality of their students when beginning their training, and use this to justify the diversion of parts of the SDL to provide basic educational activities.

Addressing these critical challenges is complicated by the fact that not all firms engage with the skills gap problem and the skills institutions and financing process in the same way. Indeed, there is a heterogeneity problem alongside the problem of rents capture.

In many cases, the reason why private organisations hardly see the results of their financial contribution to VETA is that firms themselves do not develop the managerial and organisational capabilities needed for them to be able to benefit from the improved skills (see Higuchi et al., 2019 for an experiment on the impacts of management training in Tanzania). This is particularly the case in Tanzania, as demonstrated by the continuous conflicting claims around the SDL over the last decade (ATE, 2011; interviews in 2018 with Cti, TPSF and the CEO Roundtable). Among small and medium enterprises with limited foreign market exposure, references to 'soft skills' are often made because employers themselves lack the organisational capabilities to assess the specific types of skills that are required to reach certain products and raise quality standards. This is one of the reasons why the World Bank Economic Survey (2017) results do not appear to point to a skills crisis in Tanzania. On the contrary, in key areas such as problem-solving and job-specific skills, a majority of firms reported that their workers reach the required skill levels, which raises questions over the usefulness of self-assessment to evaluate the existence of a skills gap.

Moreover, while a number of companies have invested in on-the-job training, the majority expect VET centres to provide ready-made skills. Companies' expectations seem to be slightly misplaced in this respect. There appears to be widespread lack of awareness that companies/employers in all countries face this challenge and have to provide on-the-job training.[5] This lack of ready-made skills in Tanzania's domestic market has often pushed a number of companies in different directions. Some have lobbied for SCs that can provide more tailored skills training. Other companies have simply ignored regulations on work permits and have employed foreign workers to circumvent the lack of domestic skills.

The attitude towards the SDL has also been very diverse, with some companies mainly focusing on its reduction rather than improved skills provision overall. While a number of

[5] Unfortunately, there has been no attempt so far to estimate the extra on-the-job training that companies have to provide in different sectors in Africa (this is available in more advanced countries only). We have attempted this in our analysis to allow comparison with common practices in other countries and across sectors; see section 4.1.

firms have been severely affected by the relatively high cost of the levy, others have found different ways to reduce their tax base with potential implications for increasing formal employment. The fact that private-sector representative organisations have been unable to a) challenge the government with hard evidence on the total amount of SDL collected from employers (despite the fact that data would be available as employers report them to the TRA directly and that TRA data are published online) and b) call the government to account for the funds allocated to VETA (despite the fact that ATE and other private-sector organisations sit on the VETA Boards and have access to financial statements), suggests that many employers are concerned that they will expose their own indiscretions in the process. Anecdotal evidence suggests that firms underestimate their total payroll and engage in employment strategies that reduce their payroll to avoid paying the full SDL.

While these differences reveal a plurality of interests and attitudes among businesses and can be seen as a problem, they can also be seen as opportunities for feasible change. So far, the debate around reforming the skills sector has been mainly driven by mistrust between government and businesses and the idea that the only solution is a reduction in the SDL. However, while this reduction in the levy might reduce (or shift) the problem of rents capture, it would not result in an increase in skills development as VET centres would not be able to operate anymore. Comparatively, many of these VETA-run centres are considered more effective than purely private sector-led initiatives across the country (see Andreoni, 2018 for a discussion on this). Therefore, instead of implementing a one-size-fits-all solution to rents capture in the skills sector, we suggest a set of potential strategies that take into account opportunities to realign incentives by 'designing for differences' (Khan et al., 2019; see Andreoni 2017b for a discussion of several sector-specific strategies in Tanzania).

2.4. Realigning incentives to account for differences: our hypotheses

Even though both the government and companies have a strong joint interest in developing skills, more often the skills sector is affected by conflicting dynamics and allegations of resource misallocations, corruption and tax avoidance.[6] To move away from this, we make the following sets of hypotheses around the existence of latent preferences (and interests) across manufacturing firms in Tanzania.

First, while all firms might be keen to see a reduction in the SDL, only those firms that are more productive – thus more technically and organisationally capable – will be willing to pay the SDL in exchange for tangible improvements in the quality of the skills supply coming from VET centres. The reason for this is that more capable companies are not concerned about reducing their tax base per se: they are relatively more concerned about getting access to adequate skills in Tanzania, and hence, to see an improvement in the VETA-run system. It is indeed in their interest to have better skills, because these firms know how to deploy them effectively and profit. Such firms can also reward higher skills because they

[6] For an estimation of the scale of this problem see Andreoni (2018).

deliver productivity increases. For these type of companies, we hypothesise that there is more willingness to commit resources jointly with VETA in exchange for changes in the design of the scheme – for example, more sector-specific and technology-tailored trainings. This is what we call an 'incentive package'.

The idea behind this first hypothesis is that there is an opportunity to realign capable firms' interests with some VETA-run centres. We hypothesise that there are some capable firms that are willing to collaborate with VETA in the design of training, including designing 'long-enough' courses, contributing to on-the-job training and responding positively to ex-post incentives. We also assume that there are VET-centres willing to adapt to these changes and that this has not happened so far because the SDL financing mechanism does not allow for such realignment of incentives. This hypothesis finds some corroboration already in the experience of the Moshi VET centre in which the re-alignment of incentives between mining companies and the local VET centre has led to the development of a pocket of efficiency (see Andreoni, 2018 for more detail).

Second, we hypothesise that the opposite is also true, although relatively less capable firms might have latent preferences that are significant for different skills-related dimensions. **In general, relatively less capable firms will have a strong preference for a reduction in the SDL, and will not be willing to discount relatively higher levies for more co-designed solutions or sector-specific training.** These firms' main concerns about a reduction in the SDL stems from the fact that they cannot really benefit from higher-level skills as they do not know how to deploy them effectively. This means that these firms will reveal an incentive package that is always skewed towards a reduction in direct contributions (monetary and in-kind) that has no conditionality attached.

For this second type of firm, the incentive package proposed for relatively more capable firms is not a feasible strategy. These smaller, less capable firms are unable to deliver the skills development outcomes that relatively more capable firms have an interest in. If we design the same incentive package for both types of firm, it will result in debasing the SDL, further weakening VET centres and no improvement in collaborations between firms and the centres. The rents that are allegedly captured by the state and used unproductively will simply be shifted towards the private sector with no positive development outcome. First experiences in this direction can be seen in action, in relation to some recent schemes in which adverse selection has led to crowding-in the 'wrong' type of firm, that is, those with the wrong type of incentives.

Table 1 summarises our hypothesised differences, dividing firms into levels of productive capabilities. We hypothesise that high capability firms will not be responsive to incentive packages that are primarily based around financial incentives (i.e. a reduction in the SDL) as they are more interested in the quality of skills development outcomes. Firms of the lower capability type, on the other hand, are primarily interested in financial incentives and will not be responsive to incentives that are purely aimed at improving skills development outcomes.

Table 1: Hypotheses on incentive packages

	Incentive package prioritising quality of VET outcomes	Incentive package prioritising costs of VET scheme
High capability firms	• **Content:** Tailored curriculum (customised for individual firms and co-developed with VETA). • **Allocation:** Sector-specific training (at least 2/3 of the SDL for sector-specific training, 1/3 for other types of training). • **Investment:** Coordinated investment in sector-specific training facilities (joint investment in training teaching staff, machinery, equipment and facilities as part of sectoral council/chamber of commerce/business association). • **Incentives for VETA:** Reward VETA for quality skills outcomes (VETA centres receive a financial reward for each student who secures a full-time job).	
Low capability firms		• **Incentives for firms:** Reduction in the SDL (in return for employment of a recent graduate), rather than reimbursement for training provision not provided. • **Incentives for VETA:** Subsidised SCs to make them cheaper to run. • **Investment:** Minimal investment on firms' own terms. • **Base:** Skills levy to be based on profits to reduce costs for less profitable firms.

Source: The authors.

In this way, 'designing for differences' for effective re-alignment of incentives that reduce unproductive rents capture calls for evidence on the differences – both in terms of the degree of firms' capabilities and the variety of interests.

3. Research design

A prominent tool to uncover latent preference structures among different stakeholder groups is the Discrete Choice Experiment (DCE). This method is widely used in transport and health care studies, but less so in social science. A standard random utility model builds the theoretical foundation for the DCEs (Hole, 2007; Lancsar et al., 2017). Assume that the utility accruing to decision-maker *n* if choosing alternative *j* can be described as:

$$U_{nj} = V_{nj} + \varepsilon_{nj} \quad (1)$$

with V_{nj} being a function of observed attributes of the alternative j (x_{nj}) and the decision-maker n (z_n) and ε_{nj} being assumed to be random. Then the probability that the decision maker n choses alternative i over j is given as:

$$P_{ni} = P(U_{ni} > U_{nj}) \text{ for all } j \neq i \quad (2)$$

The utility is assumed to be approximated by a function that is linear in parameters, so that:

$$V_{nj} = x'_{nj}\,\beta + z'_n\,\gamma_i \quad (3)$$

We chose a mixed logit model for estimation, due to the assumed heterogeneity in preferences in our sample. Mixed logit models allow for latent scale and preference heterogeneity by allowing estimated parameters to vary around their mean, so that β in (3) is defined as:

$$\beta_j = \beta + \eta_j \quad (4)$$

with η_j being the random variation around the parameter mean β (Lancsar et al., 2017). The mixed logit model has other advantages as well, as it accounts for the panel structure of the DCE data, provides more reliable standard errors and moves away from the proportional substitution assumption that is often violated (Hole, 2007).

In a second step, indices, that capture firm characteristics, are constructed by use of principal component analysis (PCA). The indices are then interacted with attribute levels to capture heterogeneity in preferences across observed characteristics.

3.1. Experimental design

DCEs require the identification of relevant attributes (e.g. the size of the skills levy) and attribute levels (e.g. 2.5%, 3.5%, 4.5%, 5.5%) to construct choice packages relevant for the research objectives (Johnson et al., 2013; Rao, 2014: Ch. 2). In this study, the identification of attributes has been guided by our extensive knowledge of the Tanzanian skills sector as well as months of semi-structured and unstructured interviews with business organisations, government officials and firm representatives. The findings of this scoping exercise and political economy analysis are summarised in Andreoni (2018).

We designed three separate DCEs that focus on different contested policy elements, namely: (1) the design of the training, (2) the nature of the skills levy, and (3) the design of incentives to firms and VETA for skills provision. Attributes (in bold with grey background) and attribute levels (bullet points) are summarised in Table 2. Note that the Size attribute is part of all three choice experiments. This allows direct comparison of the preferences identified by estimation of the relative willingness to pay. Size and Length are coded as continuous variables in the model estimation. Non-linearities are explored by considering quadratic forms of the continuous variables.

Table 2: DCE attributes and attribute levels

(1) Training	(2) Levy	(3) Incentives
Size	**Size**	**Size**
What would be an appropriate size for the skills levy? • 2.5% • 3.5% • 4.5% • 5.5%	What would be an appropriate size for the skills levy? • 2.5% • 3.5% • 4.5% • 5.5%	What would be an appropriate size for the skills levy? • 2.5% • 3.5% • 4.5% • 5.5%
Length	**Frequency**	**Incentives for firms**
What should be the length of typical certified training provided by VETA? • 6 months • 9 months • 2 years • 3 years	With what frequency should the skills levy be payable? • Monthly • Quarterly • Yearly	What would be the most favourable concession against a contribution to skills training? • Reimbursement of incurred training costs up to 20% of levy • Reimbursement of incurred training costs up to 30% of levy • 30% upfront reduction of levy for the first three years of employment of a recentd VETA graduate
Content	**Allocation**	**Investment**
Who should oversee the design of the curriculum of the training? • VETA in consultation with business associations/chambers of commerce • Business associations/chambers of commerce and ratified by VETA • Newly established sector skills councils[a] and ratified by VETA • Customised curriculum by individual firms co-developed with VETA	How should the skills levy be allocated and managed? • Pooled: 1/3 to VETA, 2/3 to National Education Fund • Pooled: 2/3 to VETA, 1/3 to National Education Fund[b] • All to VETA: 2/3 for sector-specific training,[c] 1/3 for other types of training • All to VETA: 1/3 for sector-specific training,[c] 2/3 for other types of training	What would you be willing to contribute to the training? • Investment in training teaching staff, machinery, equipment and facilities • Providing access to machinery, equipment and facilities in the company • Joint investment in training teaching staff, machinery, equipment and facilities as part of sectoral council/chamber of commerce/business association
Placement	**Base**	**Incentives VETA**
What share of work experience should the ideal training have and in what way should the work experience be ensured? • 2/3 theory and 1/3 field placement/internship • 1/3 theory and 2/3 field placement/dual apprenticeship	How should the levy be determined? • Levy as a percentage of payroll • Levy as a percentage of profit	In your opinion, which incentive would make VETA centres most responsive to your company's needs and improve the quality of training? • VETA centres retaining the profits from offering SCs at competitive rates • VETA centres receiving a subsidy for providing SCs customised for individual firms • VETA centres receiving a financial reward with each student who gets a full-time job

Notes:
a) Sector Skills Councils would be composed of private sector firms, training providers, labour, ministries and relevant regulatory agencies with a strong employer majority to promote public–private sector cooperation.
b) Higher Education Students' Loan Board, NACTE, Ministry of Labour National Apprenticeship and Internship Programmes.
c) Via newly established sector skills councils.
d) VETA graduate who graduated within the last two years.

Source: The authors.

We generated a seven-task d-efficient design for each DCE with zero priors (ChoiceMetrics, 2018: Ch. 6). Participants were asked to rank three alternatives in each task. This brings the DCEs to a total of 21 tasks in our survey. The design was motivated by an effort to balance boredom with statistical power and enable participants to take breaks between the DCEs. Entries were dummy coded so that coefficient estimates of Eq. (3) measure the strength of preference of the attribute level relative to the omitted level of the attribute (Hauber et al., 2016).

The DCEs were complemented by a ranking exercise. Participants were asked to complete the ranking before conducting the DCEs. The purpose of the ranking was twofold. Firstly, it gave participants the opportunity to familiarise themselves with the different attribute levels that were subsequently used in the DCEs. Enumerators were advised to probe participants on their understanding of attribute levels during the ranking exercise by asking them to provide reasons for their ranking choice. Secondly, the results of the ranking exercise provided researchers with a quick sense check on revealed preferences as well as an easy opportunity to gauge firm characteristics across which preferences might differ.

The ranking exercise and DCEs were further complemented by a comprehensive questionnaire to identify firm characteristics (the full questionnaire and DCEs are available from the authors upon request). The tool is divided into three parts which require completion by different personnel. Part A covers general characteristics of the organisation including location, main activities and ownership structure. Part B contains the ranking exercise and the DCEs. Part C covers characteristics of the company around: (a) the company's capabilities and competitiveness and (b) employment and skills.

3.2. Sampling strategy and data collection

Tanzania's *Annual Survey of Industrial Production 2016/17* was used as sampling frame. We selected firms across 10 manufacturing sectors with more than 20 people engaged, located in six regions in the north east of the country: Arusha, Dar es Salaam, Iringa, Kilimanjaro, Morogoro and Tanga.[7] The six regions combined cover about 82% of total manufacturing value added in Tanzania, and hence the selection provides a cost-efficient way to cover a substantial share of large manufacturing companies in the country (Andreoni, 2017: Table 9). The choice of manufacturing sectors was motivated by our aim to cover sectors across different technological classifications; low-tech, medium-tech and high-tech as defined by the United Nations Industrial Development Organization (UNIDO)[8] (see also Tregenna and Andreoni, 2020: Table 1). The strategy yielded 117 pre-selected medium and large establishments (see Table 3). This sample was then complemented by several smaller establishments located in Dar es Salaam. The number of establishments registered in Dar es Salaam with 5–19 people engaged came to 400 (see last column of Table 3). We aimed to cover another 70–80 firms from this population to reach a total sample size of around 200 establishments.

[7] Tanga includes Coast as a newly established region.

[8] See https://stat.unido.org/content/learning-center/classification-of-manufacturing-sectors-by-technological-intensity-%28isic-revision-4%29.

Table 3: Firms selected by sampling strategy

Sector[ab]	Sub-sector[c] Groupings	No. of large firms selected	% coverage of total						No. of small firms in Dar es Salam
			All regions & large firms			All regions & all firms			
			No. of firms	Value added	Employees	No. of firms	Value added	Employees	
Manufacture of beverages	L	16	40%	61%	55%	22%	61%	54%	4
Manufacture of chemicals and chemical products	H	9	39%	26%	31%	11%	25%	29%	5
Manufacture of fabricated metal products	M	5	26%	46%	27%	0%	42%	8%	66
Manufacture of food products	L	49	32%	37%	33%	2%	36%	26%	118
Manufacture of furniture	L	5	21%	7%	13%	0%	6%	5%	68
Manufacture of other non-metallic mineral products	M	8	21%	77%	35%	1%	73%	21%	33
Manufacture of rubber and plastics products	M	13	41%	56%	42%	22%	55%	40%	0
Manufacture of textiles	L	7	29%	24%	12%	2%	24%	12%	7
Manufacture of wearing apparel	L	2	25%	25%	9%	0%	21%	5%	44
Manufacture of wood and of products of wood and cork	L	3	17%	3%	6%	0%	2%	3%	55

Notes:
a) Number of people engaged 20+.
b) Selected regions: Arusha, Dar es Salaam, Iringa, Kilimanjaro, Morogoro and Tanga.
c) L: low-tech, M: medium-tech, H: high-tech.

Source: The authors.

Information on size and nature of operations of the selected firms was cross-referenced with data collected by REPOA for the *Global Competitiveness Report* and the most recent list of companies registered with the Business Registration and Licencing Authority (BRELA). The remaining firms were then contacted via telephone to confirm the information held by the research team. During the process, several firms were found to have ceased operations since the 2016/17 survey. To compensate for the smaller sample, large and medium-sized establishments form additional sectors were included in the final sample.

Following this augmented sampling strategy, a total of 178 large and medium size firms and 38 small firms were reached, resulting in a total sample of 216 after data cleaning. Seven of these firms (all small) were excluded from the analysis as the missing data share was too large, leaving a sample size of 209 (see Appendix A). In line with our sampling strategy, the largest shares of firms in the sample are located in Dar es Salaam (62%), Arusha (14%) and Morogoro (11%), the three regions that rank highest in terms of total manufacturing value addition (Andreoni, 2017: Table 9). See Table 4 for a full breakdown of the sample by size of firm, sector and technological classification.

Table 4: Firms reached by sector and size

Sector[a]	Sub-sector[b]	Medium & large firms[c]	% relative to sampling strategy	Small firms	Total	% share in sample
Crop and animal production	-	3	-	0	3	1.44%
Fishing and aquaculture	-	1	-	0	1	0.48%
Manufacture of basic metals	M	19	-	1	20	9.57%
Manufacture of beverages	**L**	**20**	**125%**	**1**	**21**	**10.05%**
Manufacture of chemicals and chemical products	**H**	**14**	**156%**	**5**	**19**	**9.09%**
Manufacture of electrical equipment	H	3	-	0	3	1.44%
Manufacture of fabricated metal products	M	3	60%	0	3	1.44%
Manufacture of food products	**L**	**19**	**39%**	**11**	**30**	**14.35%**
Manufacture of furniture	**L**	**12**	**240%**	**5**	**17**	**8.13%**
Manufacture of leather	L	4	-	0	4	1.91%
Manufacture of machinery and equipment	H	5	-	2	7	3.35%
Manufacture of other non-metallic mineral products	**M**	**12**	**150%**	**7**	**19**	**9.09%**
Manufacture of paper	L	8	-	0	8	3.83%
Manufacture of pharmaceuticals	H	1	-	0	1	0.48%
Manufacture of rubber and plastics products	**M**	**17**	**131%**	**2**	**19**	**9.09%**
Manufacture of textiles	**L**	**7**	**100%**	**2**	**9**	**4.31%**
Manufacture of tobacco products	L	2	-	0	2	0.96%
Manufacture of wearing apparel	**L**	**4**	**200%**	**0**	**4**	**1.91%**
Manufacture of wood and of products of wood and cork	L	3	100%	0	3	1.44%
Other manufacturing	-	1	-	0	1	0.48%
Other mining and quarrying	-	2	-	1	3	1.44%
Printing and reproduction of recorded media	L	10	-	0	10	4.78%
Repair and installation of machinery and equipment	-	0	-	1	1	0.48%
Services	-	1	-	0	1	0.48%
Grand total		**171**	**136%**	**38**	**209**	**100%**

Notes:
a) Sectors included in the sampling strategy are highlighted in bold. Industry affiliations have been established by drawing from information provided in Part A question 1.4 with Part C question 2.1 and with reference to ISIC Ref. 4: https://unstats.un.org/unsd/classifications/Econ/Download/In%20Text/ISIC_Rev_4_publication_English.pdf
b) L: low-tech, M: medium-tech, H: high-tech.
c) Medium and large firms are those with 20 or more employees. Small firms are those with fewer than 20 employees. Firms with no information about number of employees are counted as small establishments also.

Source: The authors.

For almost all sectors, the number of medium and large firms in our sample exceeds the number in the pre-selected sample. Some firms have only recently started operations and hence are not included in the 2016/17 survey. However, the great majority of firms that have not previously been covered have grown over recent years and have since crossed the threshold of 20 or more people engaged. With the coverage of sectors expanded, we were able to reach a more balanced sample in terms of technological classification with 55% of firms falling into the low-tech category (70% in the pre-selected sample).

The DCEs and the questionnaire were piloted in January and February 2019 and the DCEs, questionnaires and sampling strategy were finalised in March 2019. Between June and August 2019, questionnaires and DCEs were coded using Open Data Kit[9] which enabled data collection using tablets. REPOA recruited 12 research assistants from its own database for enumeration.[10] Enumerators went through a two-day intensive training course in early September 2019, which was facilitated by both REPOA and the SOAS research team. The training covered the objectives of the project, the survey instrument, the data entry software and data entry management, as well as fieldwork logistics. After completion of the training, the survey was piloted again with selected firms in Dar es Salaam that met the sampling criteria but that were not part of the sample. This was followed by a feedback session in which some final refinement of the questionnaire coding was made.

A face-to-face approach was used in gathering the data. Several segments in the company's structure were engaged in responding to the questionnaire, including, but not limited to, the chief executive officer, head of operations and/or commercial manager as well as head of human resources or payroll. All participants were informed about the research project and its objective. Due to the nature of the questionnaire (which was split into three segments), several visits were required in most cases to collect the data and responses were matched by use of a unique identifier.

[9] https://opendatakit.org/

[10] The database is updated on an annual basis as new graduates enter the job market, and some of the old ones get more permanent jobs. A person is eligible to be a fieldworker if he/she possesses a university degree or if he/she is a student at a higher learning institution and has time for the fieldwork. The databank is maintained in such a way that research assistants are grouped according to their academic background.

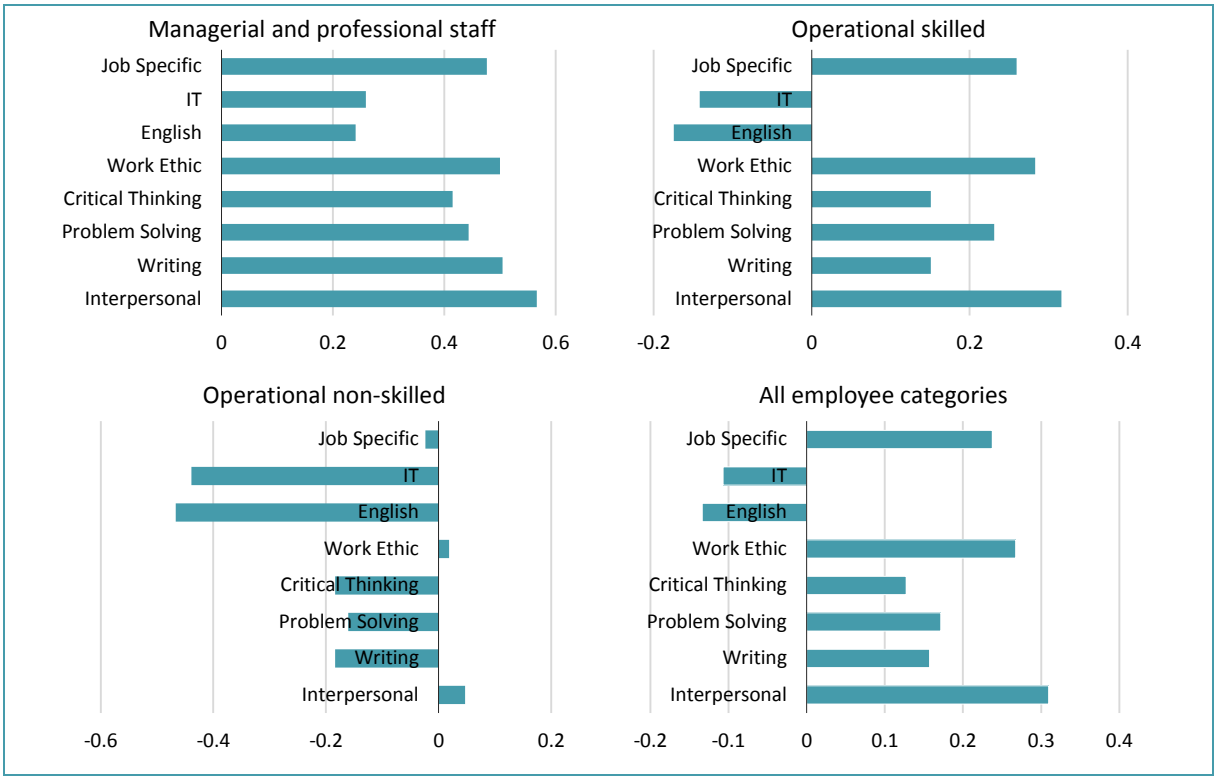
4. Research results

The questionnaire provides comprehensive information about the skills profile of employees, the perceived and actual skills gap as well as the amount, type and costs of training provided by Tanzanian employers. These insights are summarised in sub-section 4.1 before we turn to the results of the DCEs. As hypothesised in Section 2, our findings suggest considerable heterogeneity of firms' preferences by size, technical capabilities, human capital and skills demand, as well as sector specific differences.

4.1. The skills gap and training provision

Part C of the questionnaire provides unique insights into the existing skills gap as well as information about the training provided by the firms interviewed. We find that, across all employee categories (from managerial and professional staff to operational unskilled workers), English language and IT skills are assessed by employers as being the least adequate. This is followed by critical thinking and writing skills, and then problem-solving skills. Non-skilled workers are rated the most deficient in all skills categories, while managerial and professional staff skills are rated mostly adequate. In all three employee categories interpersonal, work ethic and job-specific skills are rated the highest; see Figure 1. The perceived skills gap is broadly in line with existing studies (Andreoni, 2018).

Figure 1: Perceived skills gap by employee category



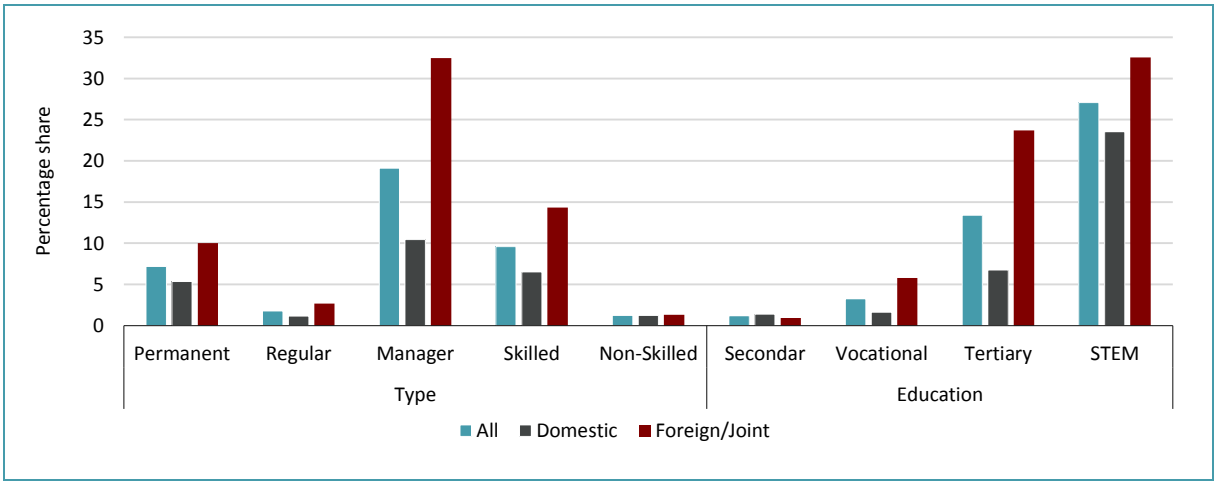
Note: Average of assessed adequacy of skills: -1 below required, 0 adequate, 1 above required. Where unknown or missing, the entry is excluded from the average.

Source: The authors.

The perceived skills gap varies not only across employee categories but also across the type of firm. Smaller Tanzanian-owned companies are more heavily affected by the perceived skills gap in English language and IT. These companies might be less able to attract highly skilled labour or tap into overseas labour markets to satisfy their skills requirements. Interestingly, job-specific skills are particularly highly rated in terms of adequacy for companies with fully automated production processes, possibly indicating the importance of on-the-job training for these establishments and sector-specific skills to operate production technologies.

The conjecture about the varied access of firms to skilled labour due to differences in ownership is supported by Figure 2. While the share of foreign workers in the total workforce is small, it is significant for managerial roles and roles requiring education in science, technology, engineering and mathematics (STEM). A quarter of all STEM positions on average are filled by foreign workers. As expected, the share of foreign workers in all categories is higher for foreign-owned firms or joint ventures, indicating easier access to overseas labour markets.

Figure 2: Share of foreign workers differentiated by employee skills characteristics and firm ownership

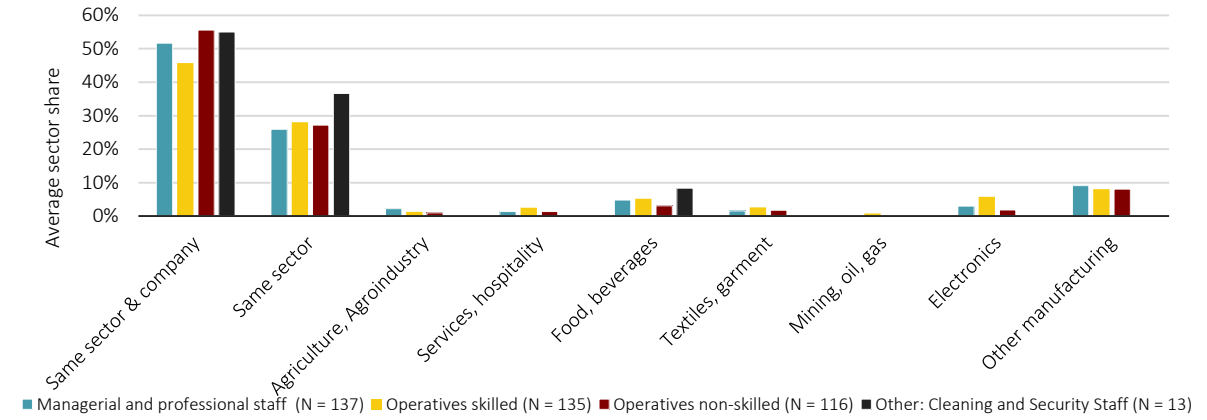


Source: The authors.

The surveyed firms reported difficulties in recruiting for open positions, with posts remaining unfilled for about 10 weeks for managerial and professional staff, 7 weeks for skilled workers and 3 weeks for unskilled workers, on average. The great majority of positions filled over the reference period was in the unskilled worker category, covering 64% of all positions filled. Skilled and managerial and professional staff accounted for 22% and 14%, respectively. Interestingly, firms reported that it took only 3.5 weeks, on average, to fill positions that required VET graduates (relatively quick compared to the skilled average) and most (65%) were found through public advertisements.

Asked about where employees gathered relevant work experience before filling their current post, employers indicated that most employees have gained experience within the same company. The relatively higher share of employees recruited internally (about 50%) across employee categories indicates that trained employees can be retained (see Figure 3).

Figure 3: Sectors in which employees gathered work experience



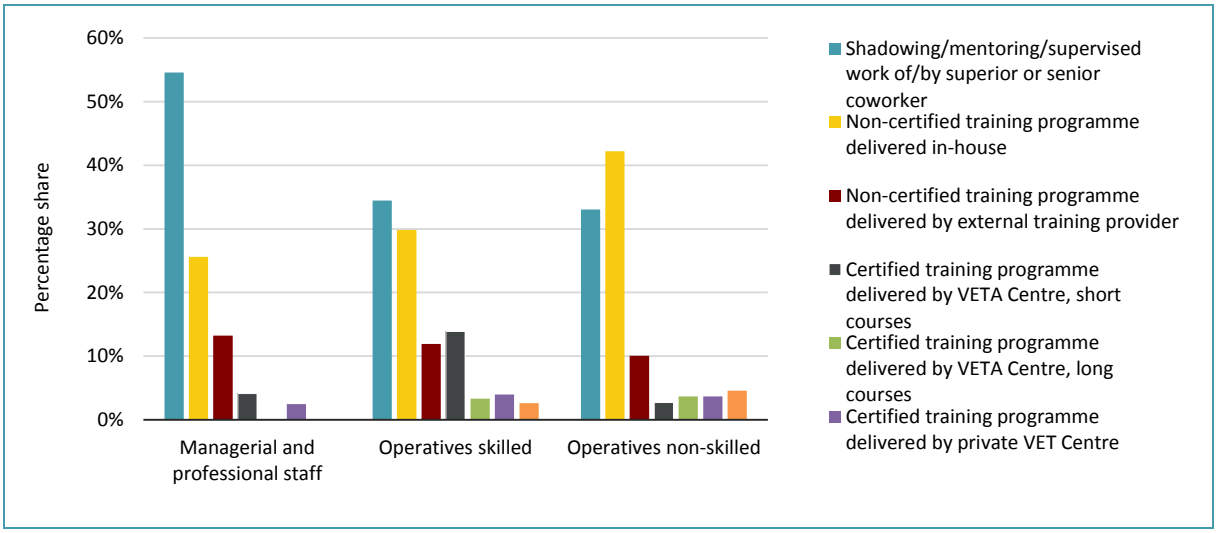
Note: N = sample size. Records work experience attained before being appointed into a current position. Average sector share.

Source: The authors.

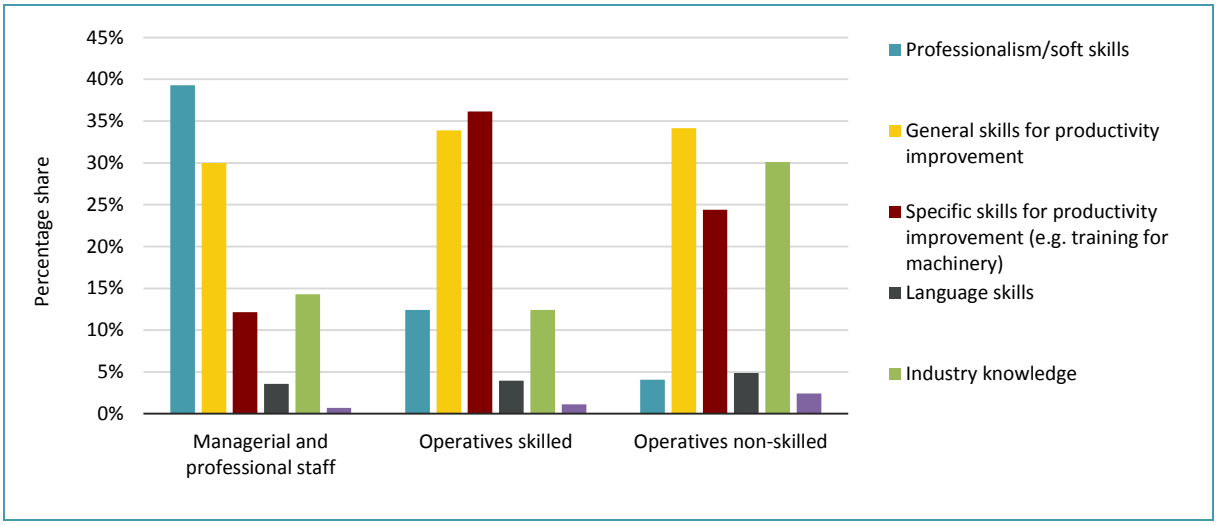
About 61% of VET graduates employed recently required additional training and more than 66% of the sampled firms indicated that they provide employees with training. The training received differs by employee type (see Figure 4a). Most training is non-certified and is delivered in-house either in the form of shadowing, mentoring and supervised work or in the form of structured but non-certified training programmes. Structured training programmes are used in particular for operative non-skilled workers, while for managerial and professional staff training is mainly received through shadowing, mentoring and supervised work. Interestingly, a substantial share of operative skilled workers receive additional certified training through VETA SCs, the costs of which are predominantly covered by the firms.

Figure 4: Type, objective and costs of training provided by employee type

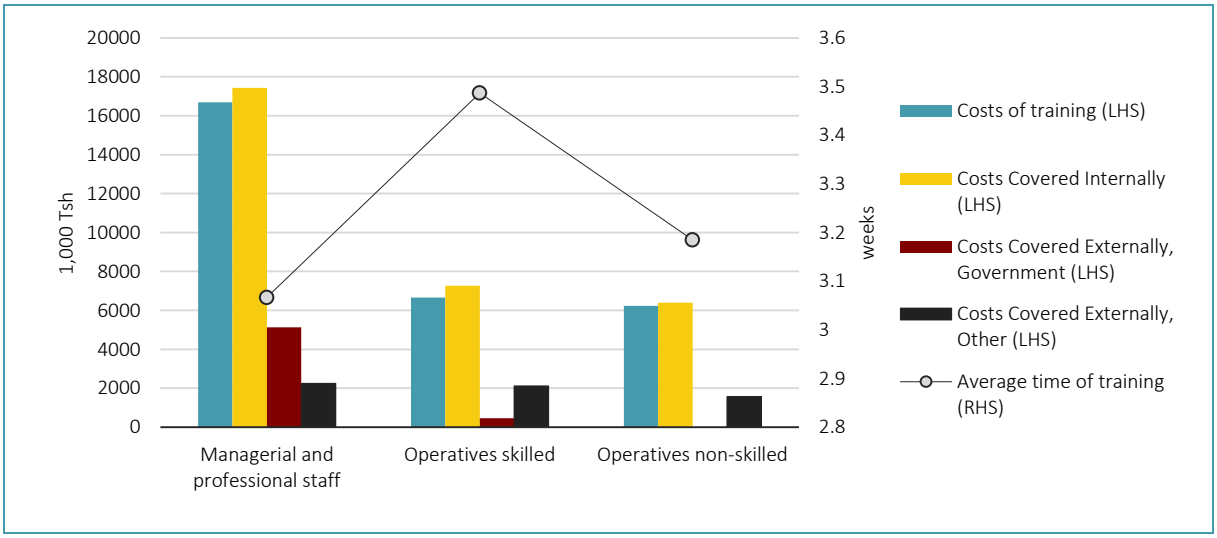
(a) Type of training received by employee type (%)



(b) Objective of training received by employee type (%)



(c) Duration and average estimated costs of training by employee type ('000 Tsh and weeks)



Source: The authors.

The objective or purpose of the training provided also differs by employee type. The main purpose for managerial and professional staff is professionalism and soft skills, followed by general productivity-enhancing skills (Figure 4b). For operative skilled and non-skilled workers, the main purpose is specific (and general) productivity-enhancing skills. For unskilled workers industry-specific knowledge is another important objective. The average duration of training provided ranges between three and four weeks across all employee types. The average costs for training provided are highest for managerial and professional staff.[11] The average training costs if covered internally are substantially higher than costs that are covered externally (Figure 4c).

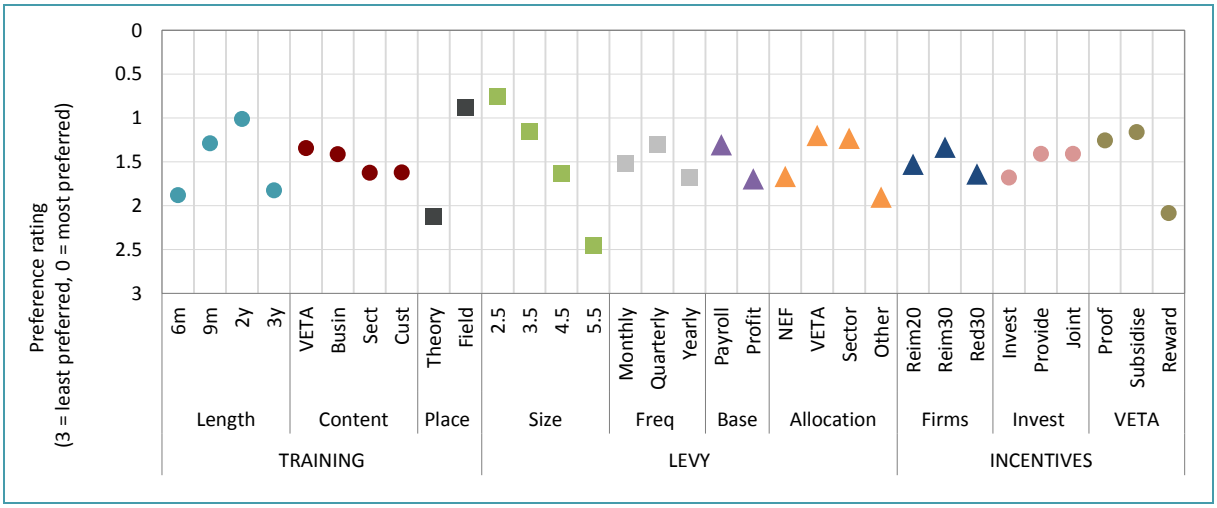
[11] High costs are incurred as managerial and professional staff are often sent abroad for specific and highly technical training.

Data obtained from Part C of the questionnaire supports the claim that firms make substantial investments into further training for their employees. However, a large proportion of these costs is incurred through provision of on-the-job training in the form of mentoring and shadowing of managerial and professional staff. Costs incurred due to additional provision of certified courses are much smaller. Interestingly, SCs are in much higher demand than LCs for post-employment training, which explains why firms voice dissatisfaction over the need to invest in further certified training. Yet, with only 66% of the sampled firms reporting that they provide training for their employees, these issues affect some but not all firms.

4.2. Preference structure

Part B of the questionnaire enables us to uncover the latent preference structure for the sampled firms with respect to: (1) the design of training, (2) the nature of the skills levy, and (3) the design of incentives for firms and VETA for skills provision. In combination with Part A and C of the questionnaire, we can evaluate how these preference structures vary based on the observed characteristics of the firms, as described in section 2. From the ranking exercise in Part B, a consistent order of preferences across all firms can be identified for length of training (two years is preferred), placements (a greater share of work placements is preferred), and size of the levy (unsurprisingly, the lowest option of 2.5% is preferred) (see Figure 5).

Figure 5: Ranking of preferences with regard to training, SDL and incentives attributes



Note: Rankings are adjusted to scale, ranging from 0 to 3.

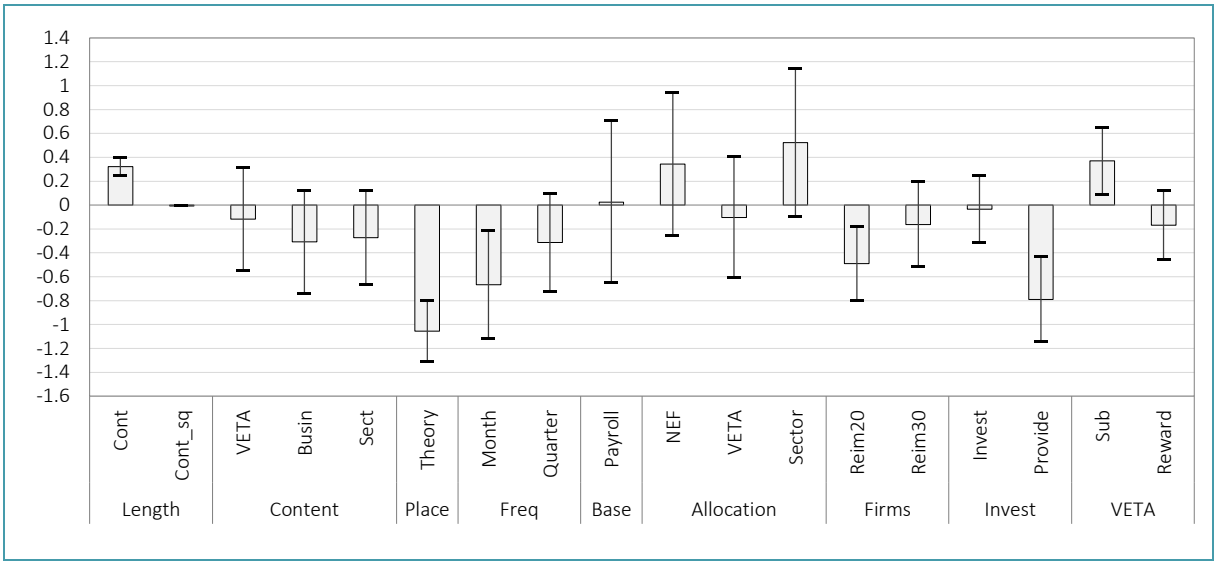
Source: The authors.

As hypothesised in section 2, the preferences revealed in the ranking exercise vary with the observed characteristics of firms. For instance, smaller firms (in terms of number of employees) and those that mainly rely on manual production processes, prefer the SDL to be based on profits rather than payroll. The reverse is the case for larger firms and those that rely heavily on semi-automatic or fully automatic production processes. The former also show a strong preference for subsidising SCs while the latter prefer VET centres to retain the profits from these SCs. Smaller firms also show a preference for the levy to be paid less frequently, while larger ones – and especially those relying on fully automatic production processes – prefer the levy to be paid monthly.

Some, but not all, of the preference structures revealed by the ranking exercise are confirmed in the DCEs. For the dummy coded attributes (all except size and length), the size of the coefficient shows the relative preference for a particular level over the omitted level for each attribute; see Appendix B for a summary of the β and η_j estimates. We see a clear preference for a smaller skills levy, which is expected. The skills levy estimates are highly significant and consistent throughout all three DCEs, which enables us to derive willingness to pay (WTP) estimates, making the preference structures comparable across all three experiments (Hole, 2007; Lancsar et al., 2017). The WTP coefficient can be interpreted as the amount in percentage of the SDL that the average firm is willing to sacrifice to gain utility (positive coefficients) or avoid disutility (negative coefficients).

Figure 6 depicts the WTP estimates for all three experiments combined with their standard errors. We find a significant preference for longer training durations with declining marginal utilities (maximum utility is reached at 21 months). We further find a strong and significant preference for a greater share of work experience over theoretical training. Results for the content attribute are less pronounced, with a small (and insignificant) preference for customised curricula over the alternatives. We also find a preference for annual frequency of payments, and a small (and insignificant) preference for the levy to be allocated to VETA and used primarily for sector-specific training. Respondents further showed a strong and significant preference for investment and joint investment in training staff and machinery over providing access to machinery; a small and insignificant preference for a 30% upfront reduction of the levy if employing a recent VETA graduate over reimbursement of incurred training costs; and a preference for VETA centres to receive a subsidy to provide SCs customised for individual firms over the alternatives.

Figure 6: Willingness to pay estimates and their standard errors



Note: See Appendix B for further details.

Source: The authors.

Comparing the DCE results with the ranking exercise from Figure 5, we find that the preferences revealed for the size, length and placement attributes are in line with the

ranking exercise. Marginal and insignificant deviations are found for the content, base and firm incentives attributes. Interestingly, the DCE reveal a preference for annual frequency of SDL payments while the ranking exercise signals a preference for quarterly payments. Further, the DCE reveal a strong disutility arising from providing access to machinery, equipment and facilities over the prospect of making a joint investment in training teaching staff, machinery, equipment and facilities as part of a sectoral council, chamber of commerce or business association. This preference is not identified in the ranking exercise.

4.3. Preference structure by differences in firm characteristics

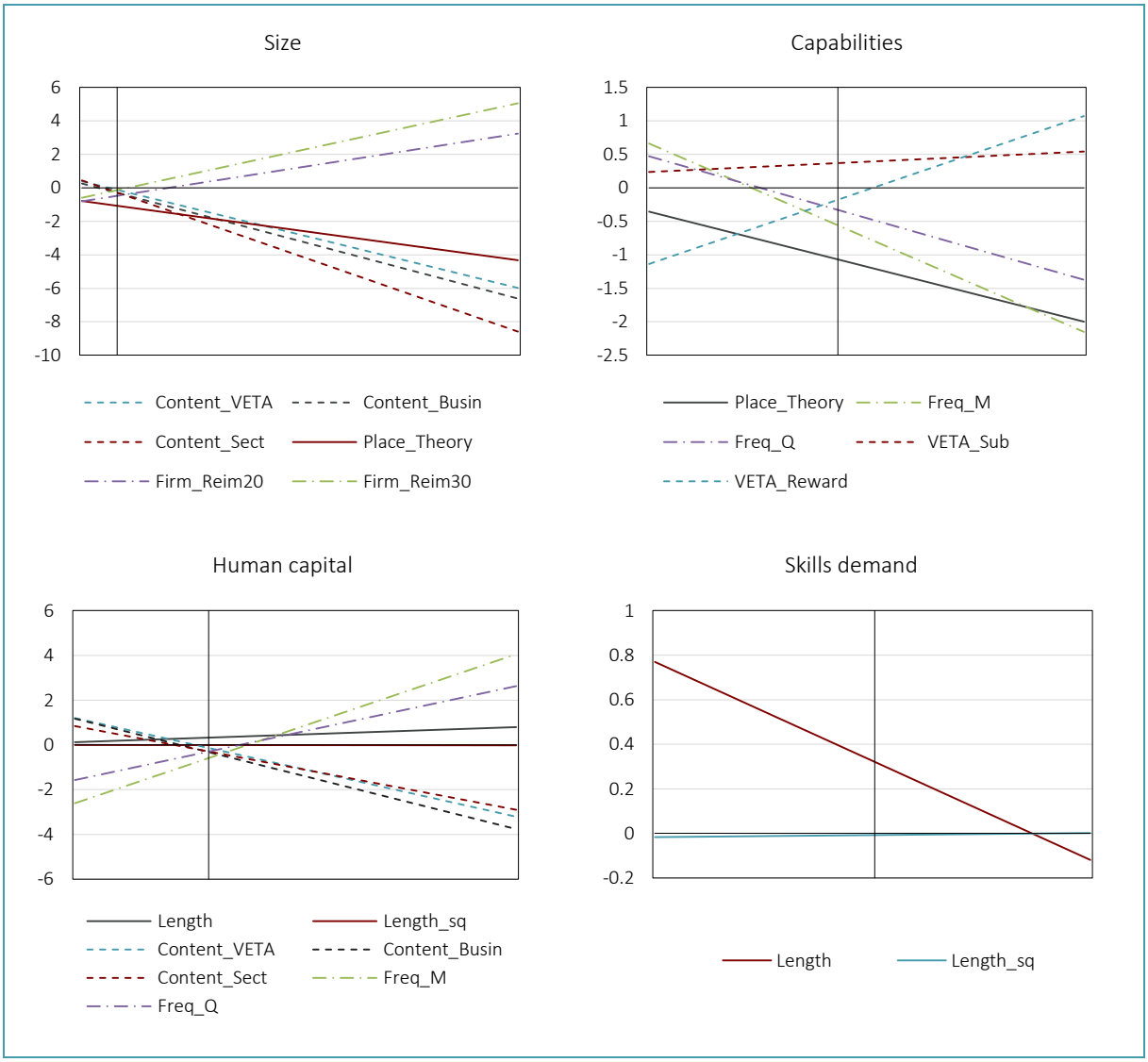
The results from the mixed logit estimation summarised in Figure 6 suggest heterogeneous preferences; see η_j estimates in Appendix B. Hence, in a second step, we evaluate potential heterogeneities in preferences across the observed attributes. Based on our hypotheses derived in section 2.4, we construct measures that capture the different dimensions of what we term productive capabilities.

By means of PCA, we construct four indices to capture company characteristics to interact with the attribute levels in each of the three DCE experiments: (a) size – number of employees, number of production lines and whether a firm is a conglomerate or not; (b) capabilities – presence of certificates and standards, presence of laboratories for quality control and research and development (R&D), level of automation in production processes and origin of machinery; (c) skills demand – growth in permanent and regular employees over reference period and age of establishment; and (d) human resources – share of skilled employees, share of employees with vocational or STEM education and share of permanent employees of total employees.

If interactions are significant, they are depicted in Figure 7. The horizontal line divides the space between utility (top) and disutility (bottom) and the vertical line between firms that are below (left) or above (right) the sample average in terms of size, capabilities, human capital and skills demand.

Our findings suggest that larger firms prefer being reimbursed for incurred training costs over an upfront reduction of the levy for employment of a recent VETA graduate – which suggests that larger firms are engaged in training provision while smaller ones are not. Large firms and those that rank highly in the human capital index show a strong preference for a customised curriculum co-developed by individual firms and VETA over the alternatives. Further, large firms and those that rank highly in the capabilities index show an even stronger preference for field placements and dual apprenticeships over theory covered in the curriculum than the average establishment. High capability firms also show a strong preference for VETA centres receiving a financial reward with each student who secures a full-time job over alternatives, a level that is not favoured by lower capability firms. Those with a high human capital index show a slight preference for longer training durations compared to the average firm, while firms with a high skills demand have a strong preference for shorter training courses.

Figure 7: Changes in WTP estimates with firm characteristics



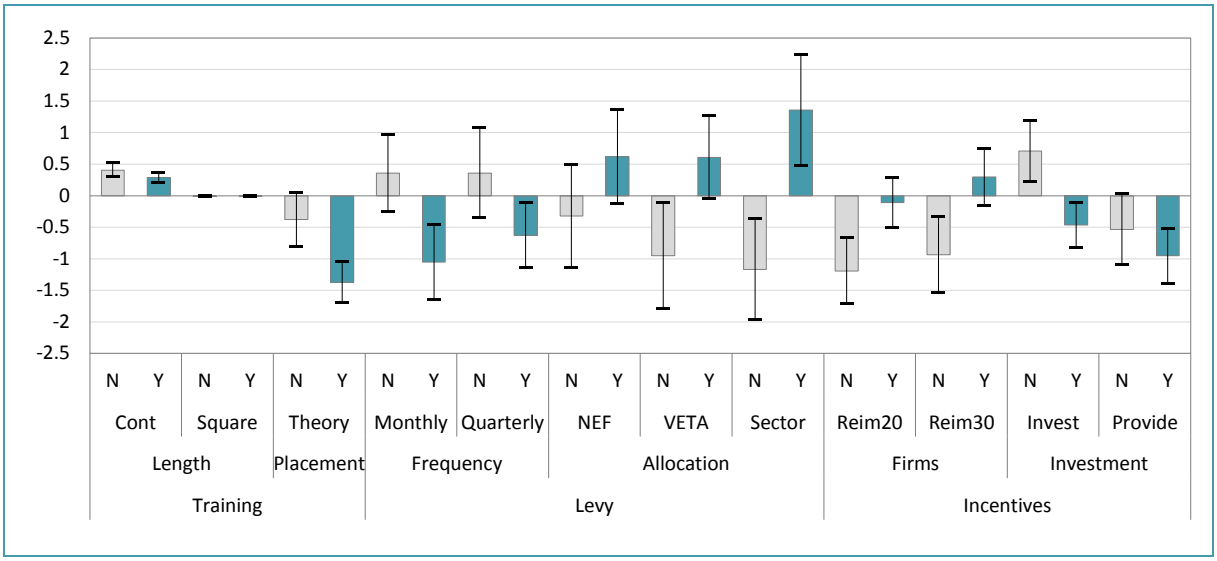
Note: Only significant interaction effects are depicted. Indices are standardised with mean zero. Hence, the vertical line marks the location of the average firm. The horizontal line divides the space between utility and disutility.

Source: The authors.

Preferences regarding the frequency of the SDL payment are somewhat inconclusive. While high capability firms show a preference for annual payments, those that rank highly in the human capital category prefer monthly payments. The somewhat surprising result for the human capital index may have arisen due to the fact that the input variable 'share of permanent employees of total employees' might capture labour intensity of production processes, which negatively correlates with the capabilities index.

In a final stage of analysis, we use dummy interaction terms to exploit heterogeneities in binary characteristics. Dummy interactions are akin to subsample estimation and hence are easily interpretable. Figure 8 summarises significant interaction effects for firms that do or do not provide training for their employees.

Figure 8: WTP estimates by training provision



Note: Only significant interaction effects are depicted. WTP estimates with standard errors. Light grey (N) = firms with no training provision; blue (Y) = firms with training provision.

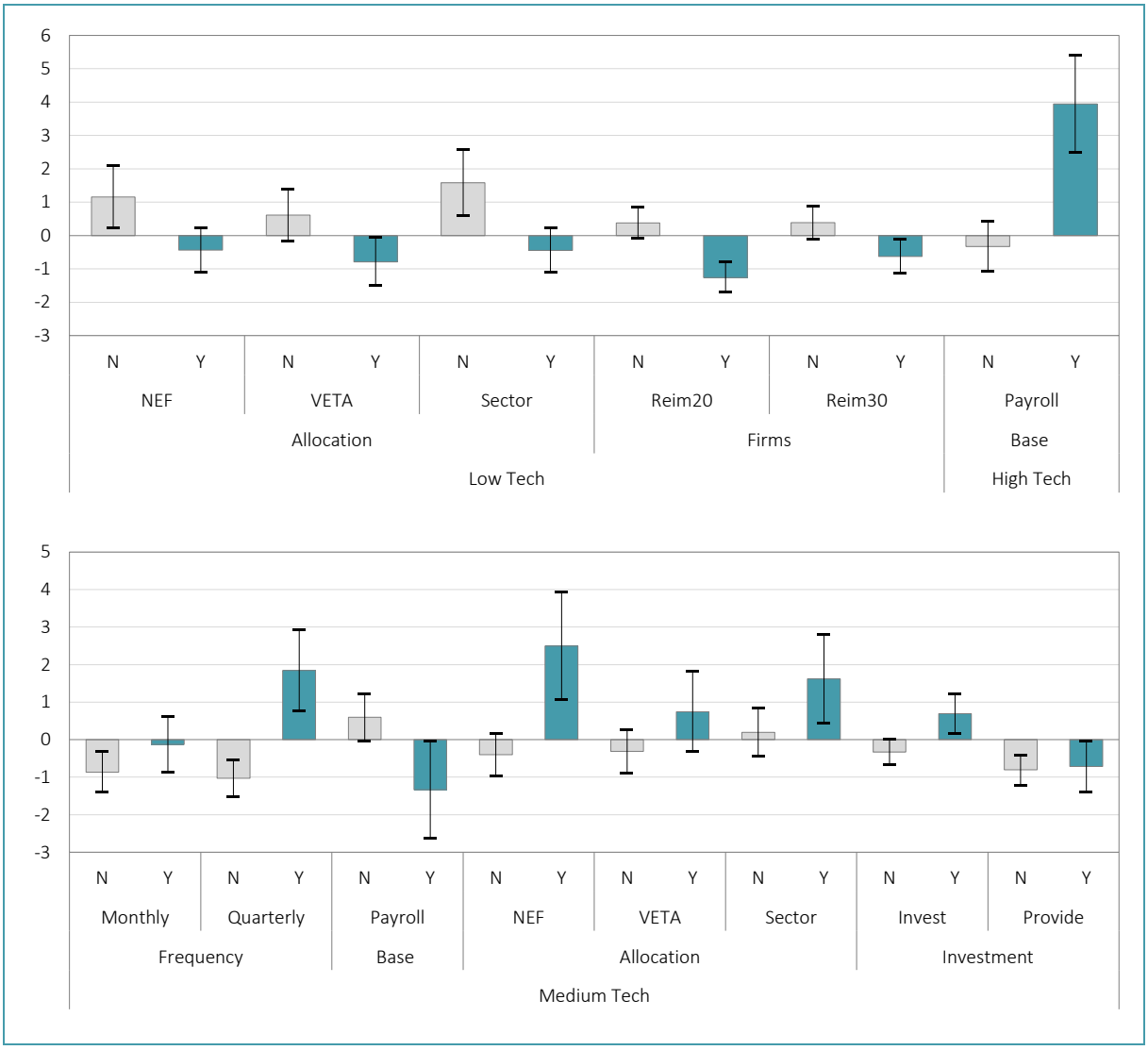
Source: The authors.

Preferences differ significantly for four attributes: frequency, allocation, firm incentives and investment; see Figure 1 for reference. Firms that provide training prefer the SDL to be paid annually (their counterparts prefer a higher frequency), the SDL to be allocated to VETA with the majority being used for sector-specific training (their counterparts prefer the majority to be used for other types of training), have no dominant preference for firm incentives for skills provision (this is expected, since they provide training regardless),[12] and prefer a joint investment in training and teaching staff as part of a sectoral council (their counterparts opt for investment without being part of a sectoral council). A significant difference in the size of the WTP estimate is observed for two attributes: length of training and placement. Firms that provide training prefer slightly shorter VET courses and show a stronger preference for a focus on work placements over theory than those that do not provide training.

The same analysis is conducted but differentiating firms by technological classification; see Figure 9. Firms in the high-tech category show a strong preference for the levy to be based on payroll rather than profit. In contrast, those in the medium-tech category prefer the levy to be based on profits rather than payroll and to be allocated either to VETA with most of it used for sector-specific training or pooled between VETA and the National Education Fund (NEF) with NEF receiving the larger share. They also prefer the levy to be paid quarterly over the alternatives and signal willingness to invest in training. Low-tech establishments are indifferent with respect to allocation of the levy and show a slight preference for an upfront reduction rather than reimbursement of the levy to incentivise their contribution to skills training.

[12] Interestingly and expectedly, firms that do not provide training prefer an upfront reduction of the levy in return for employment of a recent VETA graduate over being reimbursed for training provision.

Figure 9: WTP estimates by technological classification



Note: Only significant interaction effects are depicted. WTP estimates with standard errors. Light grey (N) = firms outside the technology classification; blue (Y) = firms within the technology classification.

Source: The authors.

The results suggest significant heterogeneity across firms, which vary by firm as well as sector characteristics. Firms that provide training regularly welcome the establishment of a sectoral council and the provision of more tailored training courses with a strong focus on field placements. These preferences align with firms that have previously been identified as large and highly technically capable. Such firms also show a clear preference for the levy to be based on payroll rather than profits. Firms that rank highly on the human capital index and have a larger share of permanent employees of total employees prefer payment of the levy to be made monthly. Firms that rank highly on the capability index prefer annual payments over more frequent ones.

Despite the differences in preference structure overall, firms agree that greater emphasis should be placed on field placements as part of standard VET courses and that the duration of courses should not exceed two years.

5. Designing for differences: an anti-corruption strategy for Tanzania's skills sector

Reforms in the skills sector have been slow in Tanzania and this has made it difficult to improve development outcomes in a key sector of the economy. While all stakeholders recognise the skills sector as a priority, there has been increasing mistrust between the government and the private sector. Allegations of SDL misallocation and double taxation from the private sector have often resulted in frustration and have cascaded in chains of rule-breaking behaviours. In some cases, for example, the lack of appropriate skills has induced companies to bend rules such as those around work permits by bribing officers in charge. The high level of the SDL (4.5%) has also acted as a dis-incentive towards formal employment. On the other hand, accusations of large tax avoidance have made it difficult to improve VET-centre outcomes, and a number of informal practices have emerged at that level along with parallel semi-formal streams of financing.

The general policy response to this low-level development trap has seen the government shifting from a position in which vertical enforcement of the rules has been preferred (indeed, SDL tax collection has increased), to one in which monetary incentives have been introduced in an undifferentiated manner. Our firm-level evidence shows why these efforts by the government have not generated the expected outcomes – the government did not take firms' differences sufficiently into account, hence it failed to re-align the incentives of key stakeholders.

We introduced two main hypotheses and tested these through a DCE approach based on a stratified sample of more than 200 companies in Tanzania. We find substantial heterogeneity in preferences (and informed choices) across firm characteristics. The main differences observed relate to their level of technical capabilities, the presence (or lack) of existing training provision in-house and their size.

For high capability firms we find significant support for sectoral councils – hence more sector-specific skills development and joint commitment of funding – and willingness to engage with curriculum design with VETA. They are also concerned about reducing the duration of trainings (to two years) and putting greater emphasis on work experience as part of training. Crucially, these firms are less concerned about the size of the levy or with other financial incentives which simply result in a reduction in the costs of a training scheme without improvements in outcomes. High capability firms also prefer an annual levy, which is expected as these are the firms that are effectively paying the levy and prefer to avoid paying a fixed monthly cost. They further favour results-based incentives to reward VET centres that are capable of delivering employable skills. This means that this group of firms is willing to support an incentive package that prioritises the quality of VET outcomes over a reduction in the cost of the scheme.

In contrast, the preferences revealed for smaller and lower tech firms appear to be significantly skewed towards an incentive package that prioritises a reduction in the costs of the VET scheme while remaining indifferent to almost all the other attributes studied. They are happy with most of the levy going to VETA and do not have an interest in a sectoral council or sector-specific training provision. However, low tech firms prefer SCs to be subsidised as they rely on them for additional training provision for their staff.

Against this evidence, it is clear that **an effective strategy to unlock failings in the sector and to enforce rule-following behaviour through horizontal enforcement should be based on an incentive package designed around the preferences of high capability firms.** Such a package would not only crowd-in the 'right' type of firms – that is, high capability firms that are crucial to lift up the sector jointly with VETA – it would also crowd-out low capability firms that are mainly interested in a reduction in the SDL. The opposite strategy – an incentive package that prioritises the costs of the VET scheme – would be in line with the preferences of low capability firms but it would not be effective in crowding in the high capability firms.

An incentive package prioritising the quality of VET outcomes has three advantages. First, it is **feasible** – it will allow the emergence of coalitions of interests across the private and public sector willing to support high-quality VET outcomes. Second, it is **effective** – it aligns the interests of the powerful organisations with the desired development outcomes. Finally, it is **enforceable and less vulnerable** to resource misallocation and tax evasion – stakeholders at the sectoral level will have a strong incentive in peer monitoring the flow of resources and in making sure they reward productive arrangements between companies and VET centres.

Table 5: A feasible anti-corruption strategy for the skills sector[13]

	Incentive package prioritising quality of VET outcomes	Incentive package prioritising Costs of VET scheme
High capability firms	• **Content:** Tailored curriculum (customised curriculum by individual firms co-developed with VETA). • **Allocation:** Sector-specific training (all to VETA: 2/3 for sector-specific training, 1/3 for other types of training). • **Investment:** Coordinated investment in sector-specific training facilities (joint investment in training teaching staff, machinery, equipment and facilities as part of sectoral council/chamber of commerce/business association). • **Incentives for VETA:** Reward VETA for quality skills outcomes (VETA centres receive a financial reward with each student who secures a full-time job).	
Low capability firms	Complementary measures: • Raise awareness about skills-specific needs and profiles • Pathways to join sectoral councils • Reform in SC provision from VET centres • Manufacturing extension service access (also in partnership with technology intermediate institutions) • Dynamic incentives with conditionalities	• **Incentives for firm:** Reduction of the levy (in return for employment of a recent graduate), rather than reimbursement for training provision not provided. • **Incentives for VETA:** Subsidised SC to make them cheaper. • **Investment:** Minimal investment on own terms. • **Base:** Skills levy to be based on profits to reduce costs for less profitable firms.

Source: The Authors.

For low capability firms, we find no evidence of a preference for an incentive package prioritising the quality of VET outcomes. These firms would like an incentive package to prioritise the costs of the VET scheme, but this would not improve the situation in the sector in terms of skills development outcomes or a reduction in rents capture. However, in selecting an incentive package that prioritises the quality of VET outcomes, **the government will need to implement complementary measures to crowd-in low capability firms – as shown in Table 5. These must take into account the specific characteristics of the low capability firms and address the specific challenges that they face.** The government must offer such firms a pathway to become more capable and to contribute more to skills development in the country. These complementary measures should have three objectives.

First, **VET centres should work to raise awareness of sector- and technology-specific skills and their benefits.** This could help low capability firms to realise the potential of joining sectoral council solutions, being involved in the co-design of skills development programmes

[13] Providing trainees access to machinery is strongly rejected across all establishments. Interviews with companies reveal that companies are concerned about the fact that trainees could damage expensive machinery. In this case, the introduction of an insurance scheme to reimburse companies would make them more willing to involve young trainees in in-house practical training at the shop floor level.

and contributing to the SDL. In turn, this would establish a different dialogue between VET centres and firms, particularly around the proliferation of SCs and their formalisation and also transparency of VET centres.

Second, **VET centres could partner with existing domestic intermediate technology institutions[14] to provide manufacturing extension services and improve organisational capabilities and operational design solutions so that skills can be deployed effectively.** Less than one quarter of firms in Tanzania have ever interacted with these organisations, another example of the problems faced by low capability firms (MITI and UNIDO, 2016).

Third, **dynamic incentives with conditionalities attached could open pathways for low capability firms to graduate towards high capability status**. This could be achieved using time-limited incentives that reward matched investments and other investments in the development of organisational and technical capabilities. The incentives could link also to the extent to which companies retain employees and are willing to invest in their workforce along the graduation journey.

In sum, there is evidence that an incentive package that combines prioritising the quality of VET outcomes (tailored around the preferences and characteristics of high capability firms) with complementary measures (tailored around the characteristics of low capability firms) that offer pathways to graduation from low to high capability status will deliver an effective strategy for the sector. This strategy has the merit of horizontal enforcement mechanisms, realigned incentives for key stakeholders and options for those firms willing to be rule-following. The overall outcomes would be one of incremental improvement in this key sector of Tanzania's economy.

[14] For example, the Tanzania Industrial Research and Development Organization (TIRDO), the Tanzania Engineering & Manufacturing Design Organisation (TEMDO), and the Small Industries Development Organization (SIDO).

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Appendices

Appendix A. Data cleaning and transformation

The questionnaire is divided into three parts: A, B and C. These parts were answered by different staff, at different points in time, and were later matched by a unique identifier. The unique ID of the device on which the answers were recorded (held by the enumerator) as well as a timestamp of the entry were also used to match the parts of the survey. This measure was introduced in case errors were made when the unique company identifiers were recorded.

Table A 1: Matching parts A, B, C of questionnaire

Missing	
AM014	Missing from C
EL009	Missing from C
EK003	Missing from C
EK004	Missing from C
Enumerator errors	
GM15	Matched with GM015 in A and C
GM0016	Matched with GM016 in A and C
Am022	Matched with Wm022 in C
PP029	Matched with PPO29 in A and C
GM010	No part A and hence not matched (A only has GM 001 but the time stamp does not match, hence both are excluded)
JM002	Appears twice throughout for different companies. Matched the first entries with ID_35 and the second with ID_60 judging by the time stamp when the data was collected.
GM005	Appears twice in C with entries identical up until question 3.2. Afterwards entries differ. We selected the first entry as the data was more in line with data from question 3.1.

Matching leaves us with 216 companies that responded to all three parts of the questionnaire. Part A and B are complete for these companies. However, Part C suffered from missing observations for several companies. Note that some questions with qualitative responses are missing from Table A2.

Out of these 216 companies, 4 companies did not respond to any question in Part C and another 3 did not respond to any questions regarding employees in Part C (Section 3). We excluded these seven companies. This leaves a set of 209 companies with complete responses for most variables.

Table A 2: Missing data for part C of questionnaire

Question	Number missing	Percent missing	Number complete
2.1_Value_Sold	66	31	150
2.2_Capacity_Utilization	90	42	126
2.3_Fixed_Assets	101	47	115
2.4.1_Investment	78	36	138
2.4.2_Turnover	80	37	136
2.4.3_Profit	85	39	131
2.5_Goods_Purchased	88	41	128
2.6_Capital_Goods	131	61	85
2.7_Machinery	19	9	197
2.8.1_Energy_Supplier	4	2	212
2.8.2_Blackouts	4	2	212
2.8.3_Owns_Generator	4	2	212
2.9_Number_Production_Lines	4	2	212
2.10_ICT	4	2	212
2.11_Certification	4	2	212
2.13_Laboratory_Quality_Control	4	2	212
2.14_Royalties_Technology	4	2	212
2.15_Laboratory_RD	4	2	212
3.1_Permanent_Regular_Employees	7	3	209
3.2_Skilled_Unskilled_Employees	7	3	209
3.3_Education_Level_Employees	7	3	209
3.4_Total_Payroll	85	39	131
3.5_Work_Experience_Employees	7	3	209
3.8_Training_Provided	4	2	212
3.11_Employee_Skills_Assessment	4	2	212

Appendix B. Detailed estimation results

Table A 3: DCE estimation results

Training							
		β	s.e.	η_j	s.e	WTP	s.e.
Size	Cont	-0.2841***	0.0490				
Length	Cont	0.0915***	0.0142	0.0426***	0.0073	0.3221***	0.0757
	Cont_sq	-0.0021***	0.0004	-0.0004	0.0004	-0.0075***	0.0017
Content	VETA	-0.0336	0.1189	0.3260**	0.1507	-0.1185	0.4276
	Busin	-0.0872	0.1149	-0.0199	0.1365	-0.3069	0.4298
	Sect	-0.0772	0.1059	0.0769	0.1682	-0.2719	0.3901
Place	Theory	-0.2998***	0.0742	0.4961***	0.1072	-1.0554***	0.2583
Levy							
Size	Cont	-0.2326***	0.0673				
Freq	Month	-0.1554*	0.0883	0.6939***	0.1120	-0.6678	0.4493
	Quarter	-0.0728	0.1008	0.4036**	0.1712	-0.3130	0.4075
Base	Payroll	0.0060	0.1593	1.0750***	0.1093	0.0258	0.6789
Distrib	P_NEF	0.0801	0.1258	0.0873	0.3987	0.3443	0.5975
	P_VETA	-0.0242	0.1189	-0.6099***	0.1266	-0.1040	0.5082
	Sector	0.1214	0.1250	0.3727**	0.1522	0.5219	0.6226
Incentives							
Size	Cont	-0.2584***	0.0543				
Firms	Reim20	-0.1266	0.0851	0.5625***	0.1078	-0.4900	0.3086
	Reim30	-0.0420	0.0922	0.5622***	0.1314	-0.1626	0.3543
Invest	Invest	-0.0090	0.0716	0.0348	0.1935	-0.0347	0.2773
	Provide	-0.2039**	0.0858	0.4535***	0.1331	-0.7890**	0.3541
VETA	Sub	0.0956	0.0702	0.0303	0.2671	0.3699	0.2784
	Reward	-0.0437	0.0734	0.1238	0.1420	-0.1690	0.2873

Notes: *, **, *** indicating 10%, 5% and 1% significance level, respectively. WTP is the willingness to pay estimate, derived by coefficient estimates over negative of the coefficient for Size. See Table 2 for attribute levels. One level is omitted per attribute, except for the continuous coded attributes, size and length.

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