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Working Paper No. 30

**The Impact of Job Training
on the Performances of
Moroccan Firms:
Empirical Evidence with Firm-
Level Panel Data**

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on the Performances of Moroccan Firms:
Empirical Evidence with Firm-Level Panel Data

Preliminary Version

Saïd HANCHANE* and Audrey DUMAS**

Abstract

The aim of this paper is to evaluate the effects of job training program, as part of the special training contracts (*contrats spéciaux de formation*) prompted by the Moroccan government, on the performances of Moroccan firms. Using firm level panel data, we highlight that the special training contracts is an efficient measure of public policy. Indeed, job training programs increase the competitiveness and the performances of Moroccan firms. Besides, these effects are even better when the implementation of training by Moroccan firms is part of a real strategy of human resources development. On the contrary, when firms consider the public policy only as a financing opportunity, they are severely sanctioned .

Key Words: Job-training, Competitiveness, Development, Management of human resources

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1 Introduction

The European Council of Lisbon defines the competitiveness of a country as its « capacity to permanently improve the living standards of its inhabitants and to give them a high level of employment and social cohesion ». The improvement for a country of its competitiveness through its national firms appear an essential issue for its economic development. Therefore, to access a path of virtuous growth, the objectives of the authorities is to promote the competitiveness of firms. Then, the question is: how can we increase the competitiveness of national firms? In a demanding and changing international context, in view of the sharp increase of technical and scientific advances, vocational training appears an essential factor of the development and the survival of firms.

Since Becker's studies (1964), until the analyses of endogenous growth (Lucas 1988), human capital appears an important determinant of the performances of a firm or of a country. The theoretical fundamentals of the relation between job training and competitiveness come from the numerous approaches that conceptualise the role of human capital and the performances of firms and nations (Becker (1964), Nelson and Winter (1982), Lucas (1988), Romer (1990)). An increase in the stock of human capital by job training affects the competitiveness of firms, firstly by a direct rise of the trainees' productivity (speed, adaptation, flexibility, improvement of abilities and skills...), secondly by taking better strategic and organizational decisions, especially concerning the training of decision-makers, and thirdly by innovation.

Considering the importance for a nation to increase the competitiveness of its firms in order to reach the economic development, and considering that job training may be a way to succeed in doing it, the aim of our article is to estimate the effects of job training programs on the performances of firms in the case of Morocco.

The previous empirical studies estimating the efficiency of job training programs focus mainly, on one hand on individual's performances and on other hand, on developed countries (United States, Great Britain, France, etc...)¹. Therefore, our study has a double originality : Firstly, we focus on an emerging country as Morocco. The conclusion of our analysis could then bring solutions concerning the management of human resources, in direct link with the problems of growth and long-term development. Secondly, our study takes the firms as a level of analysis. Then, we differ from approaches in line with Becker or macroeconomics studies related to endogenous growth. Our objective is to discern the effects of job training at a more aggregate level, that allow to include the direct effects on employees' productivity, the effects on the organizational management, and those on the innovative capacities of the firm.

We use two Moroccan databases for our empirical analysis. The first one from the "Office for Vocational Training and Labour Promotion" (OFPPT), list Moroccan firms that have implemented job training programs, as part of the special training contracts (STC) prompted by the Moroccan government, from 1996 to 2004. The second one comes from the Ministry of Industry, Commerce and Telecommunications (MICT) of Kingdom of Morocco, and brings economic indicators on Moroccan firms. We enhance these two databases with a

¹ See : Barron J., Black D. and Loewenstein M. (1989), Barron J, Berger M. and Black D. (1999), Veum J. (1999), Booth A. and Bryan M. (2002), Holzer H. (1990), Lynch L. (1992), Goux D. and Maurin E. (1997), Both A. (1993), Parent D. (1999).

survey administrated to firms identified in the two previous files. This new database is then the third originality of our work.

The results of our empirical analysis highlight three points. First of all, the special training contracts (STC) is an efficient and relevant public policy of lifelong training. The STC improve the competitiveness and the performances of Moroccan firms. Nevertheless, the efficiency of training programs depends on the context in which firms implement the STC. Indeed, when the use of the training programs by the firm meets the objectives of the public policy, firms get an additional return of 14.50% on their turnover and of 11,44% on their output value. On the other hand, “opportunistic” firms, i.e. that consider the STC as a simple financing opportunity to reduce their training expenses, are severely sanctioned, because their performances does not increase.

Our article is organized as follows: Our database is described in a second section. In the third section, several descriptive statistics are presented, in order to emphasize the link between the training programs of Moroccan firms and their competitiveness. The evaluation strategy is proposed in a fourth section, and the results are exposed in a fifth section. Lastly, we conclude and present proposition for further research.

2 Our database

2.1 The surveys and their matching

- The sample of training firms

For our analysis, we need a panel of firms at different period of time with economic indicators and with their job training expenses. But no database like that are available for Morocco. However, there are two databases, which can provide these information, if we match them. The first one is the survey of the Ministry of Industry, Commerce and Telecommunications (MICT), and the second one is the survey of the Office for Vocational Training and Labour Promotion (OFPPT).

The database MICT contains economic indicators of firms that belong to the industrial sector of Morocco. It is composed of two panel files for the period of time 1997-2003, and listing first the economic indicators of Moroccan firms and second the employees' occupations of the firm. The files do not have a firm identifiant. Thus, a first work is to match the two files with the help of the corporate name and the province of the firm. Only reliable matching are taken into account. Consequently, we obtain 10826 firms for the period of time 1997-2003.

The Office for Vocational Training and Labour Promotion proposes to Moroccan firms that are subject to the vocational training tax, a financial contribution of their training expenses. This contribution is of 70% of programmed training expenses, i.e. training that takes part of a training project, of 40% of non-programmed training expenses, and of 80% of literacy training. When training programs of the firm are accepted by the OFTTP, we consider them as special training contracts (STC). The database OFPPT include all the STC of Moroccan firms from 1996 to 2004 (20183 training programs). For our study, we select only programmed and non-programmed training programs. We obtain 17328 training programs done by 4591 firms from 1997 to 2003.

In a first place, firms of MICT are matched with the firms of OFPPT to lead to a file of 779 firms. These firms belong to the manufacturing sector and their head office is in the province of Ben Slimane, Casablanca, El Jadida, Kenitra, Mediouna, Nouaceur, Mohammedia, Rabat, Sale, Settat, Skhirate – Temara.

In a second place, we consider statistical criteria to guarantee the consistency of the data and of the econometric analysis. Then, we select from the previous sample, the firms that have economic indicator since 2000 and for at least two years, that have at least one training program within 2000-2003, and that have economic indicator and training programs at the same period of time for at least one year. 322 firms correspond to these criteria.

- *The control sample*

In a third place, we need a sample of firms that do not train, in order to compare the performances of our training firms with a control group. We choose to select randomly a sample of firms that is not concerned by the public policy, from the database MICT, according to the characteristics of the firms that trained with the SCT.

The sampling method, that we choose, is the stratification. The population is then divided into stratum according to several variables correlated with the studied variable. Within each stratum, a sample is randomly selected. Considering that for some variables, we do not have data for the three years of our study, we choose the three following variables as criteria of stratification for the last year which firms are observed, (that is generally 2003): turnover, firm size (number of employees), and the sector. Even if there is a partial correlation between the size of the firm and the turnover, we use this stratification because it implies differences in productivity. The training and non-training firms are divided into twelve subgroups, and lead to two remarks: First of all, there is a high concentration of large firms (>50 employees) that train. Secondly, there is no significant difference in the structure of training firms through the sector, even if we can notice a larger proportion of training firms in metalworking industries, and a smaller proportion for textile industries.

For the control sample (of the same size than the sample of training firms), we draw randomly firms from the database MICT, within each stratum. This sampling method allows to obtain more precise estimates than with a simple sampling, because within each stratum the statistical units are homogeneous. The selection of the control sample is done in accordance with the proportion of the training firms in each stratum.

2.2 The questionnaire administered to firms

In a fourth place, questionnaires are given to selected firms, in order to obtain more information concerning the context in which training programs take place or have not taken place. Besides, this survey also allows to identify the effects of STC in firms that use this public policy compared to firms that have never experienced it and compared to firms that do not train at all. To be more precise, questionnaires bring information about the legal and productive organization of the firms. They allow to determine the strategies, the factors and the constraints of competitiveness. They also give information about the activities and projects as regards technological and organizational innovations. Indeed, the analysis of

capital human's effects cannot be done seriously, without taking into account the conditions in which they are accumulate.

Firstly, the best way to evaluate a public policy is to use the criteria of the principal, here it is the government through the Office for Vocational Training and Labour Promotion. Then, we include in our questionnaire the criteria that we can observe in the official texts that explain and describe how SCT must be use. There are as follows: to include the training in a development projects of the firm and to help the firm to identify their skill's needs; to promote the emergence of a training demand in the firm, to help the firm to better plan their training needs. We add a last context in which training must take place: SCT is a simple financing opportunity to seize in order to reduce the training expenses. These variables allow to evaluate the efficiency of public policy by taking into consideration the context in which the SCT take place.

Secondly, the way that SCT training programs may affect the performances of firms can also be evaluate according to the strategies and the means of the firms to manage their training policy. The questionnaire allows to identify some of them, with the same approach than the European surveys on training within firms (CVTS surveys). Indeed, our survey brings five indicators on the mechanisms that firms may identify their training needs. We identify firms that have a training center, that have a training responsible, that use often or sometimes an extern advices services for their training policy, that start often or sometimes an explicit procedure to identify the training needs, and that often or sometimes interviews their employees to identify their training needs. Remind that these variables are interact with the variables that indicate if firms have use SCT training programs or not.

Thirdly, it is also asked to training firms as part of the SCT, if they also train independently of the SCT. It is then an indirect way to know if the firms that train the most are those who know better how to seize the public policy. For the firms that do not train, we asked them more precisely about the constraints of training and about their intentions to use or not SCT for their future projects of training. Concerning firms that train without using SCT, we asked them if they will use the public policy in the future.

For obvious reasons of costs and feasibility, and as regards the difficulties we meet to carry out the surveys, the investigation zone is limited to the "Large Casablanca". We then obtain a sample of 356 firms. Firms that are absent in this new sample are firms that have disappeared, have wrong addresses, or have refused to answer for unknown reasons. To be more precise, we obtain 192 training firms with SCT, and 164 firms that do not train or train without SCT. However, this last category is quite small, because only 21 firms are in this case. Then, considering our sample, Moroccan firms train predominantly with the help of SCT.

2.3 The final database

In the fifth place, we match the main sample with the control sample composed of firms that have answer to the questionnaire.

After, we eliminate the absurd values concerning the variables "Investment", "Turnover", "Exports" and the "Output value", we have a non-cylinder panel of 256 firms, with 631 observations from 2001 to 2003. The observations at 2000 have been eliminating with this restriction rule.

This database keeps a quite balanced repartition of training and non-training firms as regards the initial situation. Indeed, in this file, we list 50.55% SCT training firms, and 49.44% non-training firms. Similarly, the temporal repartition of firms is also well balanced. 9.73% of firms are present only one time in the file, 34.76% two times, and 55.86% three times². The sector repartition is also balanced. 44,21% for textile, clothing trade, and leather, 19,33% for metalworking industry, machines, and means of transport, and 36,45% for the other industries. Similarly, the repartition of the sample according to the firm size respect the structure of Moroccan industries, with around 80% of PME.

To sum up, we can emphasize that our rule of a non-cylinder panel do not modify the structure of our sample considering the initial situation. It is also important to remind that a cylinder panel on the only three considered years, would lead to a bias more important than with a non cylinder panel, and would eliminate around 56% of firms, to obtain in the end only 143 firms.

3 Some descriptive statistics

3.1 What are the characteristics of firms that train their employees as part of the specific training contracts (STC) and those that do not train?

In the first place, we can compare the structure and the strategies, projects and achievements as regards innovations of firms.

Firstly, the training and non-training firms are in the majority mono-site firms, and do not belongs to a national group or are not a multinational. Then, for these two types of firms, delivery time, finishing issue, packaging and design are, according to them, the most important factors that influence the competitive performances. However, when we analyse the questions about their strategies, wide differences are noticeable between the two types of firms. For example, 25,52% of training firms consider that the improvement of employees' skills are very important for their general strategy versus 9,15% for the other firms. It is the same for the improvement of the quality of existing products (56.77% versus 43.27%) and for the development of a technique of new production (19.27% versus 9.76%). Training firms use also quite more technological assistance by computer or advanced technology. Lastly, they are also more to undertake organizational and technological changes in the past and declare that they will continue doing that in the future.

In the second place, we can focus on the objectives and the evaluation of the results of firms that have apply STC.

The most cited objectives are the increase of the returns, the support of the equipment modernization and the improvement of the quality, the communication and the human relations between employees. Besides, 74.48% say that they have inform their employees about these development projects with training. Concerning the objectives that firms have about employees, they expect especially an improvement of their productivity (84,38%), an adaptation to their work station (85,94%) and the improvement of skill's transfer between employees (64,06%). Then, a majority of firms declare that they have given promotions

² This repartition is exclusif; in other words, there is 9.73 % firms, 34.76 % and 55.86%, all different from each other.

Panel Data

(61,98%), undertake workstation changes (53,13%) or increase the wage of trained employees (43,75%). Lastly, we can highlight that 29.69% of training firms consider the STC as a simple opportunity of financing to seize in order to reduce the training expenses, and that we called « opportunist » firms. Nevertheless, most of firms say that they use STC in order to include training in their development projects (59,9%) and to identify their training needs. 34.90% of training firms have also propose training programs since 2000 to 2004, with their own resources.

In a third place, when we are interesting in the reasons of no training, or the not use of SCT, 69.51% firms answer that they prefer recruit someone with the required skills or 68.29% firms say that the actual skills and abilities of their employees correspond to the needs of the firm. 52.44% of firms say that they want to train in the next few years, and more than one third (37.20%) want to use SCT to achieve it. 16% firms plan to train with their own resources.

These statistics underline that the two categories of firms, SCT and non SCT, have quite different point of view about the role of human resources, and that imply contrasting opinion about training in general. The SCT firms believe in the qualities of accumulated knowledge on the workplace to be modernized. The non-SCT training firms have a static view of skills, because they think that if they search they would immediately find on the extern market (Remind that they are 68% to think like that). Furthermore, these results reveal a strong willing of training firms to increase their returns and their employees' productivity. Consequently, the question is in which extend the firms get actually extra returns after the implementation of SCT.

3.2 Are the training firms more competitive?

Are the training firms more competitive ? To answer to this question, we refer to the litterature on the Average Treatment Effect. The problem of the program evaluation for our study can be exposed as following (Wooldridge (2002)).

Each firm has a result variable, as their turnover, with and without the implementation of STC. We can define y_0 as the turnover without the implementation of STC, y_1 as the turnover with the implementation of STC. w represent the treatment, i.e. it is a dummy variable indicating if the STC have taken place or not. Assuming an idendendant and identical sample, the difference between the turnover with and without the implementation of STC is the average treatment effect, i.e. the average effect of STC on the turnover.

$$ATE = E(y_1 - y_0)$$

Nevertheless, we cannot have the turnover with and without the implementation of STC for one firm.

The turnover, y , of a firm is equal to the turnover, y_0 , and to the extra turnover that we get with the implementation of STC, i.e. the difference between the turnover obtained with and without STC, $(y_1 - y_0)$, if firm apply STC, $w=1$, Then, the turnover can be expressed as follows:

$$y = (1 - w)y_0 + wy_1, \text{ or: } y = y_0 + w(y_1 - y_0)$$

Panel Data

In a first time, we can assume that the the implementation of STC, w , is statistically independant of the turnover, y . That happens when the implementation of STC is randomly distributed among firms. Then, we can show that :

$$E(y/w = 1) = E(y_1 / w = 1) = E(y_1) \text{ and } E(y/w = 0) = E(y_0 / w = 0) = E(y_0)$$

Then, the average effect of the training can be expressed as follows :

$$ATE = E(y/w = 1) - E(y/w = 0)$$

That imply that at the end of the training program, on average, the turnover of firms, if they would not have use STC, would be equal to the turnover of firms that do not implement STC, and vice-versa. Consequently, evaluating the effects of the SCT consist to determine what is on average the difference of the performances between training and non training firms, if we assume that STC are randomly assigned.

Table 1 : Means of economic variable according to SCT training firms and non-SCT training firms.

	Training firms	Non training firms
Turnover	38529.9	30760.3
Productivity	36057.6	29720.4
Exports	13493.7	12019.5
Investment	2099.31	1193.56

Firstly, we consider the turnover, the output value, the turnover for exports and the investment as a proxy of the competitiveness of the firm. When we compare the means of this variables between training and non-training firms, we notice that STC firms have the best means. For example, the turnover and the output value of the training firms are on average 25% and 23% higher than non-training firms. Concerning the investment, training firms appear to be in a radically different dynamic, because the first one invests on average 75% more than the second.

Secondly, we use variables that indicate the context on which SCT have taken place. Indeed, it is obvious that the effects of a public policy would not be the same according to the way that the firms use the public policy in its development projects. Then, we calculate the differential of economic variables means, between firms that have include the training program in their development projects and those who have just consider training as a financing opportunity to seize in order to reduce their training expenses. Firms that have use STC in their development project have on average a higher turnover around 29% compare to non-training firms, whereas it is around 25% previously when we do not take into account the context of training. Conversely, when we compare the turnover of firms that consider STC as a financing opportunity, and the non-training firms, the mean differential falls to 10,64%. Lastly, firms that use training in their development project have a 9% higher turnover than opportunist firms.

Table 2 : Mean of economic variable of firms depending on whether they train with the criteria « include the training in their project development and help to identify their needs » or not

	Training firms with the criteria of project development	Other firms
Turnover	41118.1	31854.9
Productivity	39007.9	30243.4
Exports	14770.7	11880.9
Investment	2093.53	1456.66

Table 3 : Mean of economic variables of firms depending on whether they train with the criteria « A simple financing opportunity to seize in order to reduce the training expenses of the firm» or not.

	Training firms with the criteria of financing opportunity	Other firms
Turnover	37730	34101.7
Productivity	35888.2	32352.6
Exports	13154.5	12689.6
Investment	1875.21	1608.32

Descriptive analysis assume a positive impact of STC on the strategies of development and competitiveness of the firm, and even more when the training program is in line with the development projects of the firm. However, these differentials overestimate the effects of the STC, because we assume that the implementation of STC is random among firms. This assumption is not realistic. Indeed, if the characteristics of the firm have an influence on the fact that they receive STC, and if these characteristics affect also the turnover of the firms, then there is a bias selection in the estimates of the average effect of STC. Thus, it is essential, in a second time, to analyse the relation between indicators of competitiveness and the use of STC with a robust econometric specification.

4 The evaluation strategy

First of all, we define the competitiveness of the firm, y , with four variables: the "turnover" and the "output value" in absolute value and per capita. We restrict our analysis to these variables, considering the numerous indicators proposed in the literature about firm competitiveness and its link with training policy. Furthermore, we evaluate on one hand the effects of STC on competitiveness by comparing training firms with non training firms. The treatment indicator, w , is then a dummy variable equal to one if the firm implement STC and zero otherwise. On the other hand, we estimate the effects of STC according to its implemented context. Then the treatment indicator, w , correspond to the interaction of the previous variable with the variables indicating the context.

Considering our database, we can apply econometric methods of panel data to estimate the effects of training. However, despite the interest of this approach, it is important to keep in mind, the constraints that these methods imply. One of the main criticism of panel data methods is the arbitrary or even imaginary distinction between fix or random effects models, according to Mundlack (1978). The model of random individual effect assumes the independence between the parameter of the unobserved heterogeneity and the explicative variables (assumption of weak exogeneity). The estimates are converging and efficient under this assumption. Nevertheless, this assumption is hardly validate with the data. Concerning the model of fix effects, the estimates are converging and efficient whether this assumption is validated or not. The within transformation eliminate the individual effect and then allow an identification of the interest parameters. However, the drawbacks of this model, is that it do not allow to identify the parameter of time-invariant variables. Even if it's true that the Hausman's specification test allow to validate a model against an other, the fix effect model often validate by the test, presents limited interpretations when we want to measure the effects of time-invariant variables (as the variables that express the context of the training implementation). But above all, it is not necessary and not recommended to assume the independence of individual effects to obtain a correct identification of the parameters. Concerning our study, it would be very difficult to justify why the unobserved effect like the management of the firm would be independent of the observable results (investment, training investment, the application of STC, innovations...).

Mundllack (1978) emphasizes that when we linearly project the individual effects onto the means of explicative variables, distinction between fix and random effect are null. Besides, the within estimator and the quasi generalised least squares (QGLS) estimator of the random effect model are equivalent and it is then also possible to identify the component of each variable in the unobservable heterogeneity. However, the initial approach of Mundlack (1978) does not allow the identification of time-invariant variables, as our explicative variables. To obtain this identification, we have to use the method of instrumental variables (Hausman and Taylor (1981)). Ideally, we would apply methods that allow to identify these parameters, as the method of instrumental variables or GMM. The approach proposed for example by Arellano and Bover (1995) that comes from a model of correlated individual effects with the Generalised Method of Moments (MMG), can unfortunately not be applied because time-variant instruments, that allow to identify the models, are not available in our study. Some extensions of this estimator are the estimator of instrumental variables of Hausman and Taylor (1981), of Amemyia and Macurdy (1986) and of Breusch, Mizon and Schmidt (1989).

Because we cannot apply these estimators, we consider another estimator that is a variant of Mundlack's (1978) and Hausman and Taylor's (1981) approaches. We apply the Within estimator in a first step to a model that includes only time-variant variables. In the second step, we regress, with a linear projection, the residual unobserved heterogeneity on the time-invariant variables. Other says, we regress the individual effects, that are the mean residual of the within estimator, on the variables that are assumed to be correlated with, like the context of STC. We obtain an estimator that belongs to instrumental variables estimators. It correct the endogeneity bias and it is a model of correlated individual effects that is robust to the non weak exogeneity of the explicative variables. To guarantee its robustness, the second step is corrected from the heteroscedasticity.

Finally, we apply two strategies of estimation: The first one is the estimation of a random effects model and the second one is the estimation in two-step. The selection bias due

to the non-cylinder panel is also corrected according to the recommendations of Nijam and Verbbek (1994).

5 The results

The first question of our article is to wonder if training via STC can influence the performances of firms. The second question is in which extend the training effects depend on the context of STC implementation.

5.1 Training as source of competitiveness

In a first step, our study focuses on the effects of the implementation of SCT on the turnover and output value of the firms. The results are presented in the table 4.

When the econometric model is not well specified, i.e. the random effect model, we obtain an effect of STC of 23,52% on the turnover, that is very close to the simple differential of mean variables, and of 16,68% on the output value. The effects on the turnover per capita are as expected of smaller magnitude. We consider that this model is not well specified because it assumes the independence of the unobserved heterogeneity with STC and with the other variables of the model. That is a very debatable assumption. When we examine the results issued from a two-step estimator, these effects are smaller. Indeed, the random effect model does not control the unobserved characteristics of the firms, that are correlated with the dependant variable, that imply they train more than other firms. The estimates indicate us an effect of 12,45% on the turnover and of 16,99% on the output value. These effects are significative in the heteroscedastic robust models.

Table 4 : Estimating the effects of SCT

Dependant variable	Log (Turnover)	Log (Turnover per capita)	Log (Productivity)	Log (Productivity per capita)
Random effect estimator	23,52	18,31	16,68	No significant effect
Two step estimator robust to heteroscedasticity	12,45	16,99	No significant effect	No significant effect

In conclusion, the SCT appear to be an efficient and relevant public measure of lifelong training. Training improves the competitiveness and the performances of firms.

5.2 The “honesty” versus the “opportunism” of firms as a condition of efficiency

In this section, the variable of interest is the interaction of the STC variable with the context of training, i.e. according to the following objectives: to include the training in a development projects of the firm and to help the firm to identify their skill’s needs; to promote the emergence of a training demand in the firm, to help the firm to better plan their training needs. A last context is: STC is a simple financing opportunity to seize in order to reduce the training expenses.

Panel Data

The results exposed in the table 5, show that firms that use training in their development projects and to identify their skill's needs are generally rewarded. With the two steps estimator, we evaluate this significant effect of 14.50% on the turnover, of 14.92% on the turnover per capita, of 11.44% on the output value, and of 11.86% on the output value per capita.

Table 5 : Estimating the effect of STC when training is included in the development projects of the firm and that help them to identify their skill's needs.

Dependant variable	Log (Turnover)	Log (Turnover per capita)	Log (Productivity)	Log (Productivity per capita)
Random effect estimator	28,11	18,31	26,47	17,73
Two step estimator robust to heteroscedasticity	14,50	14,92	11,44	11,86

Firms that use STC to promote the emergence of training demand do not have significant effects on their performances. That means firms are not in the stage, where the training may affect directly the productive performances of the firm. They might apply STC only to start this dynamic. The question is then to know if in the future, this behaviour will help them to make their development projects a reality.

On the other hand, for firms that use STC to plan better their training needs, we obtain a significant effect around 12% on the turnover per capita, and over 13% on the output value per capita (Table 6). These values are close to those identified with the objective "SCT is include in their development projects". The use of public policy as a middle to plan the training needs and to identify the actual needs, that correspond to the competitive concerns of the firms, increases the turnover per capita and the output value per capita, even if there is no significant effect on the turnover and the output value. In these firms, training programs would be targeted to individuals whose individual competences have an important impact on the whole workforce.

Table 6 : Estimating the effect of STC when training help to plan better the needs of training

Dependant variable	Log (Turnover)	Log (Turnover per capita)	Log (Productivity)	Log (Productivity per capita)
Random effect estimator	26,79	No significant effect	28,53	19,93
Two step estimator robust to heteroscedasticity	No significant effect	11,99	No significant effect	13,20

Concerning firms that use STC as a financing opportunity, firstly there is no significant effect and secondly there is even a negative effect of -14.48% on the turnover and -13.26 on the output value (Table 7). Considering the differential of means that we have calculated in the previous section, these results are not surprising. The differential disappears

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when our model is well specified, but it also becomes negative. Thus, it is not thanks to the implementation of STC that the simple differential of means variables underline an effect of 10,64% on the turnover, but rather thanks to other characteristics that we control in our model. When firms have a “stowaway” strategy with the public resources, firms are severely sanctioned.

Table 7 : Estimating the effect of STC when training is a simple financing opportunity in order to reduce the training expenses of the firm.

Dependant variable	Log (Turnover)	Log (Turnover per capita)	Log (Productivity)	Log (Productivity per capita)
Random effect estimator	Negative and non significant	Negative and non significant	Negative and non significant	Negative and non significant
Two step estimator robust to heteroscedasticity	-14,48	Negative and non significant	-13,26	Negative and non significant

As a conclusion, “opportunistic” firms are severely sanctioned and the “honest” firms are rewarded. Indeed, those last firms get returns of 14,5% on their turnover and 11,44% on their output value, when they implement STC.

5.3 Training in line with a strategy of human resources management

Finally, we evaluate the effects of the STC on the performances of firms according to the strategies and the means of the firms to manage their training policy. We consider the interaction of the STC variable with the following variables: the firm has a training center, the firm has a training responsible, the firm often or sometimes uses an extern advices services for their training policy, the firm often or sometimes starts an explicit procedure to identify the training needs, and the firm often or sometimes interviews their employees to identify their training needs.

Our more robust results (two step estimates) show that the variables “training center”, “extern advice services” and “explicit procedure to identify the training needs” do not have significant effect on the performances of the firm. Indeed, we do not know anything about the quality of these material resources (“training center”, “extern advice services”), then these resources are not enough to get the best returns of STC. Similarly, the use of an explicit procedure to identify the training needs, is certainly not the best way to optimise the SCT. Besides, if the development of a training supply is beneficial to maximise the returns of training on the improvement of the firm’s competitiveness, our results do not allow to confirm that. The human resources represent a challenge for the long-term development of a country as Morocco, it is then crucial that the needs of advice and support expressed by firms, must be structured by a market, where public and private agents can vary their offer to correspond with the best way to the demand expressed by firms. It is obvious that Morocco is not at this stage, even if efforts are made to reach this objective.

Conversely, the existence of a training responsible and a training department, or in other words an actor whose principal function is to link development projects of the firms to

Panel Data

training and to optimise the use of STC, appears to have a strong impact on the paths of performances of firms. In our models, the implementation of SCT with a training responsible has a significant effect of 10.81% on the turnover, 11.75% on the turnover per capita, 11.65% on the output value, and of 12.59% on the output value per capita (Table 8). When training and its planning becomes part of the general organization of the firm, then the SCT returns are maximized, because the efforts of public authorities results in a efficient allocation of the training effort within the firm.

Table 8 : Estimating the effect of STC when there is a training responsible

Dependant variable	Log (Turnover)	Log (Turnover per capita)	Log (Productivity)	Log (Productivity per capita)
Random effect estimator	27,72	17,27	27,64	18,19
Two step estimator robust to heteroscedasticity	10,81	11,75	11,65	12,59

The effects of STC is even more apparent when we consider firms that implement interviews with their employees and cooperate with the whole workforce to identify their training needs. These interviews and their seriousness can exist only if firm consider training as a tool to improve the competitiveness. The effects of this variable are significant and around 12.81% on the turnover, 13.11% on the turnover per capita, of 11.44% on the output value and of 11.74% on the output value per capita (Table 9).

Table 9 : Estimating the effect of STC when the firm lead often or sometimes interviews with their employees to identify their training needs.

Dependant variable	Log (Turnover)	Log (Turnover per capita)	Log (Productivity)	Log (Productivity per capita)
Random effect estimator	25,78	21,29	23,45	19,39
Two step estimator robust to heteroscedasticity	12,81	13,11	11,44	11,74

As a conclusion, the STC has different effects according to the means that firms choose to manage training policy. Besides, firms that believe in training effects, are those who maximize the returns of STC. Indeed, firms that use this public policy as a way to improve their performances, get the highest returns. Similarly, firms that cooperate with their employees, to identify their skill's needs succeed in ensuring a consistence between their objectives and those of the public policy.

We can also give other examples to show that STC have varied effects according to the context in which they take place. Indeed, when STC are used to support the equipment modernisation or the equipment maintenance, these effects are significantly of 13.06% on the turnover, of 10.21% on the turnover per capita and 11.69% on the output value in the first case, and of 13.93% on the turnover and of 12.21% on the output value per capita in the second case (Table 10 and 11).

Table 10 : Estimating the effect of STC when firms support the modernisation of equipment

Dependant variable	Log (Turnover)	Log (Turnover per capita)	Log (Productivity)	Log (Productivity per capita)
Random effect estimator	34,51	20,34	31,28	18,91
Two step estimator robust to heteroscedasticity	13,06	10,21	11,69	Non significant

Table 11 . Estimating the effect of STC when firms improve the maintenance of equipments

Dependant variable	Log (Turnover)	Log (Turnover per capita)	Log (Productivity)	Log (Productivity per capita)
Random effect estimator	29,80	18,11	26,46	16,30
Two step estimator robust to heteroscedasticity	13,93	Negative and non significant	12,21	Non significant

When training is use to encourage the objective of capturing new market, these effects are immediate, because firms can gain extra turnover of 9,82% (Table 12). Training can also imply higher returns when it is a means to reduce the conflicts on the workplace, or in other words, when it is a mean to improve the quality of human resources within the firm, with an effect of 11.96% on the turnover (Table 13).

Table 12: Estimating the effect of SCT when firms want to capture new market

Dependant variable	Log (Turnover)	Log (Turnover per capita)	Log (Productivity)	Log (Productivity per capita)
Random effect estimator	17,62	Non significant	Non significant	Non significant
Two step estimator robust to heteroscedasticity	9,82	Non significant	Non significant	Non significant

Table 13 : Estimating the effect of SCT when firms improve the quality of human relations between employees

Dependant variable	Log (Turnover)	Log (Turnover per capita)	Log (Productivity)	Log (Productivity per capita)
Random effect estimator	22,30	Non significant	Non significant	Non significant
Two step estimator robust to heteroscedasticity	11,96	Non significant	Non significant	Non significant

We would like to notice that we estimate these effects independently of each other's, in order to avoid colinearity problems and a fall in the freedom degree that may lead to a bad

identification of the parameters. We have estimate a model, in which all the variable of context was included, and also all the variables that are in our questionnaire, and we can still identify the positive effects of the variable that we have presented, but with over estimated coefficient, that imply a problem of colinearity.

6 Conclusion and future research

This study, with ambitious objectives considering we focus on Moroccan firms, allow us to obtain interesting results about the performances of firms that have or that have not trained their employees through the special tranining contrats (SCT).

In the first place, we emphasize that the managers of the firms have different perceptions of the STC, according to their interpretation of the role of public policy and its contribution to the achievement of their development projects. Then, “opportunistic” firms are severely sanctioned, whereas “honest” firms are rewarded with an improvement of their competitiveness and their performances, whether measured by the turnover or the output value.

In a second place, the STC appears to be an efficient and relevant measure of public policy concerning the lifelong training, and especially when firms consider training as part of their development strategy. The success of this training incentive to firms depends mainly on the way that firms consider and use this policy, and not on the public decision-maker. A better understanding of the role of SCT will depend, for a large part, on the quality and the importance of information and communication that will circulate on this topic within employers and unions.

Now, several future perspectives of research can be proposed. It is now possible to view the training issue from other angle. We can for example study directly, with this database, the link between the use of SCT and the projects of technological and organizational innovations. Similarly, we can analyse the link between the effects of training programs on the firm performances and their effects on the employees’ productivity. Indeed, a questionnaire has also been administered to employees of the firms listed in our study. This questionnaire allows to identify the employees that are trained by the firm at the survey date, but also by their previous employers.

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