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The effect of industrial cluster policy on firm performance in Ethiopia: Evidence from the leather footware cluster

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Tigabu Degu Getahun

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Bonn, January 2016

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Abstract

This paper empirically analyzes the productivity, profitability, innovation and network effects of a public policy promoting micro and small scale industrial clusters in Ethiopia. To this end, firm-level survey data was collected from randomly selected clustered leather shoe manufacturers that have directly benefited from the policy and those that do not, both before and after the cluster policy intervention. The results from econometric analysis suggests that the industrial cluster policy adversely impacts the productivity, profitability, growth, and innovation performance of the small and micro leather shoe manufacturing enterprises that moved to the government created clusters . The analysis of the transmission mechanism further reveals that the relocated cluster policy hampers the treated firms' collaborative business and knowledge network and aggravates their growth impediments which includes lack of trust, high customer and supplier search and reach cost, lack of market information, imperfect contract enforcement, delays in the supply of raw materials and the lack of skilled labor. The time lag between policy implementation and its impacts may conceal the long-term impact of the cluster policy. The overwhelming majority of the representatives of treatment group firms also continue to believe that their buisness performance will improve over time as a result of their participation in the MSE cluster development program. This study is a pioneer to quantitatively evaluate the productivity, profitability, innovation and network effect of industrial cluster policy in Ethiopia.

Keywords: Cluster Policy, Productivity, Profitability, Networks, Small and Micro Enterprises, Ethiopia

JEL-Classification: D02, D04, D25,D85,L11, L52, L67, O14

1. Introduction

Since the seminal work of Porter (1990), a public policy promoting industrial clusters has captivated the interest of policy makers in developed and emerging economies (Bachtler et al. 2005). Many countries in the world including Germany, Brazil, Japan, South Korea, and France have developed specific cluster policies to improve the performance of domestic firms (Martin et al. 2010). Case studies of examples such as Styria (Hartmann 2002) and Basque Country (Aranguren et al. 2006) have documented the results of implemented cluster policies. Only very few of these studies, however, have extensively evaluated the effects of cluster policies on the performance of domestic firms (Martin et al. 2010, Nishimura and Okamuro 2011). The policy dimension in clusters also remains controversial (Andersson, 2004).

As in the rest of the world, the Ethiopian federal government in collaboration with its international development partners has also recently implemented specific cluster policies to foster the development of its manufacturing sector. To this end, the government establishes special industrial zones and clusters in the vicinity of the capital, Addis Ababa, with basic infrastructure and facilities including roads, telecommunications, water and electricity (IDS 2003, GTP 2011). Since 2003 the federal government's industrial development strategy has also identified a few sectors for special government support in addition to the general support incentives. In this regard the leather, and leather footwear companies have received the most government attention. For example, the government established the Leather Development Institute (LDI) and a specialized training institution called the Ethiopian Leather and Leather product Technology Institute (LLPTI) to help provide an adequate supply of skilled manpower for the leather and leather shoe sector (IDS2002, GTP, 2011). Ethiopia is also targeting USD 1 billion of annual investment on the development of industrial clusters over the next decade mainly to increase the export competitiveness of large scale manufacturing (Bloomberg, 2015).

In addition, following the growing optimism in the development literature concerning the growth, and export prospects of Small and Micro Enterprises (MSE), the Ethiopian government has also recently constructed various building complexes and transfer to small and micro manufacturing enterprises at a highly subsidized lease price, as part of its industrial cluster policy. According to the Federal Micro and Small Enterprises Development Agency the government has so far transferred more than 2,075 work premises to manufacturing SMEs at a total cost of ETB 300 million (Ali 2012)[i].

In this regard the leather shoe manufacturing SMEs benefit most. As of the survey period, the government had constructed and transferred various building complexes and shades to leather shoe SMEs at highly subsidized rents. Each firm pays only a monthly work place rent of 2.5 ETB per square meter. The first largest government created cluster is located in Yeka sub city of the capital, 20 km away from the spontaneously emerged mercato leather

footwear cluster. The Yeka building complex covers six blocks of G+4 buildings, occupying a total working area of about 11,000 square meter. To promote specialization and division of labor, each block (and firm) was designated for only one of the six intermediate production stages: shoe upper manufacturing, bottom cutting and preparation, shoe assembly, lasting, marking, and finishing. This, however, has not been materialized until the survey year (2013). The second largest building complex, called the Rimo building, is located in the western part of the capital called Mesalemiya. In the Rimo cluster there were about 80 leather shoe manufacturing firms. The third government created cluster is located in the sub-city of Kolfe-Keranio around 18 Mazoria in the capital. In this open-air facility there were more than 21 leather footwear SMEs along with various textile and other cottage enterprises. Most of the firms that moved to these government created clusters were operated in the spontaneously emerged cluster in the western part of the capital. In the literature such types of government created clusters are often referred to as 'relocated clusters' (see Ali 2012)[ii].

The primary objective of the SME cluster development programs were: (i) to provide working premises to firms, (ii) to minimize financial constraints on firms, (iii) to maximize agglomeration benefits to firms, (iv) to create platforms for deliberate joint actions so that small firms could benefit from economies of scale and integrate themselves into international markets, (v) to promote specialization and division of labor among firms, and (vi) to facilitate linkages with the larger footwear manufacturers through subcontracting, outsourcing, and franchise arrangements. The analyses presented in this paper are intended to evaluate whether or not the SME cluster development programs have succeeded in achieving these objectives and improved the performance of firms that located in a government created cluster.

Despite the policy optimism about the growth, productivity, and profitability effects of cluster development policies among researchers, policy makers and development practitioners, rigorous research based on representative samples and reliable counterfactuals scenarios have been lacking for Ethiopia. Only very few empirical studies worldwide have also extensively evaluated the impact of cluster policies, even though cluster policy is seen as a powerful instrument for improving the performance of clustered manufacturing firms. Therefore, this study is one of the first attempts to empirically evaluate the impacts of cluster policies. This study is the first effort in Ethiopia intended to provide firm-level evidence on the performance of clustered firms that benefited from the policy and a control sample of firms that did not benefit, both before and after the implementation of the cluster development program.

Quantitative and qualitative survey data were collected both before and after the implementation of the cluster policy from randomly selected, clustered leather footwear manufacturers; 86 of which had benefited directly from the SME cluster development program and 196 had not benefited directly from the program. Throughout this study the first group of firms is referred to as the "treatment" group and the second group is referred

as a “control” group. Both the treated and control firms were operating in the spontaneously emerged Mercato footwear cluster before the implementation of the relocated cluster.

In the present analysis endogenous location choice is not expected to be a serious problem because all of the sampled firms had initially been located in the spontaneously emerged mercato cluster in Addis Ketema sub-city of the capital. It was only in 2011 the treated firms had relocated to Yeka and Kolfe-Keranio sub-city of the capital as part of the government led- cluster development program. Thus, in terms of the characteristics that influence firm location choice, it is highly likely that those firms that moved into the relocated cluster (treatment sample) and those that remained in the “spontaneously originated” cluster (control sample) to be similar. To separate the cluster policy impacts from the benefits of agglomeration, the study drew the control sample firms only from the sampling framework of footwear manufacturers that have operated in the spontaneously emerged Mercato cluster. That is, non-clustered footwear manufacturers were excluded from the cluster policy impact analyses because their inclusion could overstate the treatment effects by confounding agglomeration benefits and policy impact.

These efforts create a good opportunity to distinguish between the impacts of the cluster policy and agglomeration benefits. Still, the non-random nature of the treatment complicates the analysis of causal relationships because the policy was directed towards treatment firms based on specific criteria. According to experts and most of the interviewed firm managers, in order for firms to be eligible to move into the government created clusters they must: (i) be a formally registered business entity; (ii) be members of a business association or cooperative (iii) properly record their sales and purchase transactions; (iv) have limited working premise; (v) be willing to use energy and space saving machinery and equipment collectively; and (vi) make a deposit of 30% of their projected investment capital into a closed account at the Development Bank of Ethiopia . To address the selection bias due to such observables, the study explicitly controlled for the influence of these and other firm- and entrepreneur-specific firm performance and location choice determinants.

The rest of this paper is organized as follows. Chapter two sketches the conceptual framework. Chapter three describes the data and the pre-intervention characteristics of the sample firms. Chapter four includes a discussion on the potential impacts of the cluster policy. Chapter five presents the evaluation method, the estimation results and a discussion of the major mechanisms through which the policy impacted firm performance. The paper is then concluded in chapter six.

2. Conceptual Framework

In the old literature Weber (1909) and Marshall (1920) formulated hypothesis that contain the fundamental elements of agglomeration economies. Weber (1909) identified three important factors that determine the outcome of firm location choices: transportation cost differentials, labor cost differentials, and agglomeration economies and diseconomies. For Marshall (1920)localized positive externalities, site-specific advantages, and pure random chance are the major causes of industrial clustering and performance differences between clustered and non-clustered firms (see Ellison and Glaeser 1997). According to Marshall (1920) clustered firms outperform dispersed firms because the former benefits from: (i) input market externality, (ii) goods market externality, (iii) labor pooling, and (iv) intra-cluster market information and production technology spillovers by virtue of being in an industrial cluster. For Marshall (1920), Porter (1990), Krugman (1991), Chaudhry (2005), and Sonobe and Otsuka (2006), the presence of large pools of alternative input suppliers and output buyers, as well as the pervasiveness of informal interactions among cluster actors and the ease of detecting unethical behavior within clusters help clustered firms to minimize transaction costs that would arise from information asymmetry and imperfect contract enforcement. This in turn impels specialization and division of labor, and thereby leads to flexibility that allows firms to start new businesses with limited start-up and human capital, as well as to benefit from economies of scale afforded at different stages of production (Chaudhry 2005). Schmitz (1989, 1995) and Nadvi (1996) extended Marshall's (1920) theory of external economies to explicitly account for deliberate joint action by clustered firms. They argued that the cluster advantage is attributed not only to the incidental external economies (Marshall´s spillover effects), which they call passive collective efficiency gain, but also to the deliberate pursuit of joint action by clustered firms, which they call active collective efficiency gain. According to their 'cluster induced collective efficiency gain hypothesis,' which has served as a work horse in cluster analysis since the 1990s, firms operating in an industrial cluster perform much better than firms operating in isolation, not only because industrial clusters attract traders, workers with cluster-specific skills, raw material and specialized input suppliers, but also because they creates venues for collaboration. For Schmitz and Nadvi (1999) joint action could be initiated by clustered firms themselves or by government and nongovernmental cluster development agents. Such joint action could include joint training efforts, joint procurement of raw material, and joint product sales. McCormick (1999) augmented the institutional context into the collective efficiency hypothesis.

Recently there is a growing recognition that Marshall´s localized externality, Schmitz´s joint action, institutional context, natural advantage and pure random chance are not the only factors that affect firm performance. The characteristics of the firm and the owner/manager of the firm such as managerial human capital, firms' years of operation also plays a key role

in determining the performance of manufacturing firms, performance measured in terms of firm size, profit, profitability, productivity and innovation performance. Syverson (2011) identified a host of firm-level productivity determinants that he divided into two broad categories: internal and external productivity determinants. The internal determinants include firm- and entrepreneur-specific factors such as education and experience of firm managers, firm age (experience), product design, and information and communication technology usage for business and R&D activities. The external determinants include four major factors: productivity spillover, competition, flexible input markets, and deregulation or proper regulation. Interestingly, industrial clustering triggers the first three external determinants (Sonobe and Otsuka 2013) and serve as an instrument for enabling firms to overcome internal limitations by joining efforts and resources with other firms, innovative institutions and universities, and related public sector organizations (Andersson et al,2004).

This study integrates concepts from the Marshall (1920) local externality theory and Syverson (2011) productivity determinant review to derive the empirical model. A detailed discussion of the empirical model is presented in chapter five.

3. Data and Pre-Intervention Characteristics of Firms

3.1 Data, survey design and variable construction

Before designing the main survey instrument and determining the sampling method, steered informal interviews were conducted with officers from the Ethio-International Footwear Cluster Cooperative Society (EIFCCOS),[iii] local woreda[iv] level government officers, cluster development agents, and selected footwear manufacturer owners and managers. These interviews not only helped to gain insight into the function and structure of the Ethiopian leather footwear manufacturing clusters, but also to discern the geographical distribution of leather footwear manufacturers. The interviews also made it possible to calculate a rudimentary estimate of the population size of footwear manufacturers in the government created clusters and the spontaneously emerged cluster. It was noted during the inception field visit that almost all of the small and micro leather foot wear enterprises in Ethiopia were located in the capital (Addis Ababa) and its suburbs.

During the inception field visit an attempt was made to obtain a complete list of leather shoe making firms operating in the spontaneously emerged cluster (control group) and those firms operating in the government created cluster (treatment group). The author and his survey team observed approximately 166 small and micro leather footwear manufacturers, two shoe sole factories, and a few raw material suppliers operating in the biggest government created cluster (Yeka cluster) in 2013. During the preliminary interview with the EIFCCOS officers, we noted that all except one had previously operated in the "spontaneously originated" Mercato[v] cluster in Addis ketema sub-city of the capital. In the second largest government created footwear cluster called Rimo cluster about 80 footwear manufacturers were operating while in the 18 Mazoria cluster only 21 shoe makers, together with a significant number of weavers, were operating. This brought the population size of the treatment firms to 259. We then randomly selected a third of these firms.

Unlike the treated firms, the complete list of the control firms, which are operating in the spontaneously originated Mercato footwear cluster, were not readily available. Such lists were obtained neither from the central statistical agency nor from the woreda-level trade and industry offices. Because a significant number of such micro and small scale shoe making enterprises were informal. An earlier attempt had been made to prepare a list of

such firms in 2008 by the Ethiopian Development Research Institute under the direct supervision of the current author. The 2008 effort was, however, only able to compile an incomplete list of such firms because a significant number of these firms were operating informally and therefore made all possible efforts to escape from the tax authority. In 2012 the list was updated through additional survey efforts. This brought the available list of the control firms to 1087, of which 196 firms were randomly selected to serve as a control group. One firm was also dropped from the control group sample because of incomplete information provided. The non-clustered firms were not included in the sampling frame of the control firms. Because such firm cannot be a reliable counterfactual as the characteristics of firms that had initially decided to locate outside of the industry clusters may not have been comparable to those that decided to relocate to industry clusters. Excluding non-clustered firms from the list of control firms would, therefore, helps to address self-selection bias.

Subsequently, firm level data was collected from 86 “treatment” and 195 “control” shoe making SMEs using structured survey instrument in 2013. The survey instrument covers a wide range of information including information about the history of firms, entrepreneur profile, and business network, extent of intra-cluster knowledge collaboration, firm location, employment, production, production cost, price, investment and initial source of financial capita. In addition, the survey instrument includes few open ended questions including the relative costs and benefits of operating in the government created cluster and the major growth constraints of the firm. It also includes few retrospective questions, one year preceding the cluster policy intervention. The use of retrospective questions in principle introduces recall bias. However, given the shorter recall period, three year, and the fact that most of the sample firms records their business transaction, the impact of recall bias is minimal in the present context. Ravallion (2008) and Nicola and Gine (2011) also argued that the reliability of retrospective survey data might not be compromised if respondents are asked about events that are easily recallable and not far distant in time. In addition, it is likely that the recall bias will cancel out in the comparison between the two groups as long as the bias is for both the control and treatment firms.

3.2 Pre-intervention characteristics of sample firms

The pre-intervention characteristics and performance of the firms that were relocated into the government created cluster in Yeka and Kolfe-Keranio sub city of the capital as a result of the government led SME footwear cluster development program is compared and contrasted with those firms that remained in the "spontaneously originated" cluster in Addis ketema sub-city of the capital.

Entrepreneur-Specific Characteristics

Table 1 reports a summary of the characteristics of the treatment and control group firms before the implementation of the cluster policy. As it can be inferred from the mean comparison t-test results, there were no a statistically significant mean difference between the control and treatment entrepreneur profiles (in terms of gender, birth place, and ethnicity), social ties (number of siblings, relatives, and friends), and in most of the variables used as proxies for the human capital of managers. The overwhelming majority of the owners of both the treatment and control groups were spinoffs. The percentage of second generation entrepreneurs whose parents were in the shoe manufacturing business were marginally greater in the treatment group than the control group. Slightly more than half of the control sample entrepreneurs (54%) and slightly less than half of the treatment sample entrepreneurs (49%) were born in the Gurage Zone, while 41% of the control sample and 45% of the treatment sample were born in the capital, however, none of these differences are statistically significant.

Likewise the treatment and control sample entrepreneurs had equal mean numbers of siblings, relatives, and friends in the leather footwear industry during the pre-intervention period. The percentages of entrepreneurs who graduated from vocational and technical school, however, were slightly higher among the treatment sample though the percentage of entrepreneurs who had completed high school (10th grade) were not significantly different between the two groups. The percentage of parents who have received formal educations is also slightly higher in the treatment group.

Table 1 Pre-Intervention Entrepreneur Characteristics

	Control	Treatment	P-value for t-test
	Percentage	Percentage	Ho: Control = Treatment
Owner/manager profiles			
Male owner/manager	99	99	0.918
Born in Addis Ababa	41	45	0.501
Born in the Gurage Zone	54	49	0.440
Gurage ethnicity	85	87	0.572
Amhara or Oromo ethnicity	13	13	0.994
General and managerial human capital			
Graduated from vocational or technical school	4	12	0.018*
Completed high school at entry	46	56	0.147
Completed high school in 2010	48	57	0.164
Previous managerial experience	15	16	0.863
International experience	1	0	0.508
Spinoff §	90	88	0.634
Intergenerational characteristics			
Second generation entrepreneurs	15	23	0.092
Father attended formal school	5	12	0.032*
Mother attended formal school	1	6	0.018*
	Mean	**Mean**	
Owners age (in years)	34.3	38.0	0.000**
Owner years of school completed at entry	8.9	9.5	0.073
Owner years of school completed in 2010	9.0	9.7	0.060
Owner lived in Addis Ababa (in years)	25.2	28.9	0.003*
Initial social ties			
Number of siblings and other relatives	4.2	4.3	0.815
Number of friends	3.3	3.2	0.779
Number of families and friends	7.5	7.5	0.997

Notes: §Spinoffs refers those entrepreneurs who formerly worked in other shoe factories before they established their own shoe making enterprise; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Characteristics of Sample Footwear Manufacturing Enterprise

As it can be inferred from the results present in Table 2, only less than handful of both groups of firms use ICT for business purposes and none of them integrated themselves into export markets. Likewise, the two groups of firms were only slightly different in terms of initial levels of working capital, machinery investment, and employment size.

Table 2 The Pre-Intervention Characteristics of the Control and Treatment Firms

	Control	Treatment	Diff	P-value for t-test
Percentage of firms using ICT	13	11	2	0.695
Percentage of exporter in 2010	0	0	-	-
Percentage of formally registered firms	77	96	-19	0.000**
Percentage of association Member firms	56	99	43	0.000**
Percentage of firms who record sales	28	38	10	0.088+
Percentage of firms who records purchase	21	32	11	0.052+
Firm age(Years Of Operation)	7	9	-2	0.003**
Total number of Initial workers	3	3	-0	0.499
Initial investment On Machinery(Birr)	5051	5316	-265	0.784
Initial working Capital	4836	4828	9	0.988

Notes: Diff. = mean (control) – mean (treatment); degrees of freedom = 279; Ha: Diff! = 0; * $p < 0.05$, ** $p < 0.01$

However, the two groups were significantly different in terms of some observable characteristics, especially characteristics that were used by policy makers to select the treatment group firms. During the pre-intervention period, 96% of the treatment firms and 77% of the control firms were registered as formal business entities. This difference is statically significant. Likewise, among the treatment group 38% of the firms recorded purchases and 32% recorded sales, whereas among the control group only 10% recorded purchases and 11% recorded sales before the implementation of the footwear development program. This difference is statistically significant and hence needs to be controlled.

Site-Specific Factors

Site-specific natural advantages implies the availability of physical infrastructure, market, financial intermediaries, and other important facilities in the vicinity of the location of the firms. As indicated before, both the treatment and control group firms were located in the Mercato area of the capital before the cluster policy intervention. This clearly entails that the two groups had similar access to basic physical infrastructures and facilities.

Overall, the treatment and control sample firms are not significantly different in terms of most of their entrepreneur-, firm-, and site-specific characteristics before the implementation of the footwear cluster development program. According to Wooldridge (2009) if two groups are similar in terms of their observable characteristics, they most probably will be also similar in terms of their unobservable characteristics. All these ease the complication of causal analysis. Still, all possible attempts are made to disentangle the policy impact from firm, entrepreneur and time specific heterogeneities.

4. Potential Impacts of the SME Cluster Development Program

Before formally discussing the econometric analysis results of cluster policy impacts, this chapter illuminates the potential impacts of the cluster policy on firm performance by comparing and contrasting the performance of the treatment and control firms, both before and after the cluster policy intervention. In the analysis various firm performance indicators such as firm size, labor productivity, profit, profitability, innovation, capacity utilization rate and return on installed capital are used.

Firm size is measured in terms of total number of workers, gross output, and fixed assets of the firm. Labor productivity is measured in terms of both physical output based and value added based measures. The former helps to identify the technical efficiency of a firm while the latter captures the combined efficiency and price effects of the cluster policy. The study computes the aggregate output in physical units as a weighted sum of the six different types of shoes, where the weights are the mean price of each type of shoe at a given point in time[vi]. Nominal value added is computed by deducting the total cost of raw materials (including transportation costs), electricity and fuel costs, and repair and maintenance costs from the firm's annual revenue. The gross profit is computed by deducting the labor cost, design fees, and broker commissions from the computed value added. The net profit is then computed by deducting interest payments and taxes from gross profit.

The physical output and value added based productivity measures and the firms profitability is then computed by dividing aggregate physical output, value added and net profit of each firm by the full time equivalent number of workers, which is computed in compliance with eight hour per day and five days per week work schedule standards. The corresponding real values of each of these variables is ultimately computed by deflating the nominal values by firm specific out price deflator. Innovation is measured in terms of the number of new designs and the number of upgrading activities the firm had undertaken one year preceding the survey. Capacity utilization rate is computed as a percentage of actual firm output to installed capacity. Table 3 reports the average performance of the treatment and control firms both before and after the cluster policy intervention; where performance is measured in terms of the aforementioned indicators.

Table 3 The Performance of Treatment and Control Firms in 2010 and 2013

	Pre-Intervention(2010)		Post-Intervention(2013)		
	Control	**Treated**	**Control**	**Treated**	**Diff-in- Diff£**
Labor productivity	96	105	98	85	-22**
VA per Worker	4334	4982	6336	5462	-1522**
Revenue per worker	8947	10392	13545	11951	-3039**
GP per worker(ETB)	3214	3634	4554	3898	-1076**
Profit per worker(ETB)	2949	3350	4146	3771	-776**
Profit (ETB)	17580	17169	30873	19748	-10713**
Real VA per Worker	4334	4982	4526	3902	-1272**
Revenue per worker	8947	10392	9675	8537	-2584**
GP per worker(ETB)	3214	3634	3253	2784	-888**
Profit per worker(ETB)	2949	3350	2961	2694	-669**
Profit (ETB)	17580	17169	22052	14106	-7535**
Firm Size					
Total pairs of shoes	467	562	649	391	-352**
Total Number of workers	6	8	9	7	-4**
					Diff (P-value)§
Capacity utilization rate (%)	NA	NA	62.7	57.4	-5.3(0.057)
Fixed asset (%)	NA	NA	76862	39093	-37769(0.17)
Capital Rate of Return (%)	NA	NA	68.0	52.9	-15.1(0.052)
Number of new designs	NA	NA	5.4	4.7	-0.8(0.176)
Number of upgrading activities	NA	NA	2.03	1.95	-0.08(0.424)

Notes: **£** Diff.-in-Diff refers the difference in the performance change of the treatment and control firms over the intervention period; $ Diff refers the post intervention period performance difference between treated and control firms. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; VA = value added, GP = gross profit; ETB = Ethiopian birr; 1USD = 14.4 ETB in 2010/13 fiscal year and 17.7 ETB in 2012/13.

The mean comparison results suggest that the two groups were comparable in terms of most of the firm performance indicators before the implementation of the relocating cluster policy. This is not surprising since the two groups were also similar in terms of most of firm, entrepreneur and location specific firm performance determinants[vii]. However, the results suggest that firms that have stayed in the "spontaneously originated" cluster outperforms those that moved to the government created cluster footwear cluster in the post policy intervention period.

The simple difference in difference estimates which are reported in the last column of Table 3 also illuminates the adverse impact of the relocated cluster policy on firm productivity, profitability, profit, size and growth. The productivity of treatment firms measured in real value added per worker declines by 22% while it rises by over 4% among control firms. Similarly, over the intervention period mean real profit and mean quantity of production among treatment firms decrease by 18% and 30% respectively, while these values increase by 25% and 39% respectively for control sample firms. The mean post-intervention capacity

utilization rate and capital rate of return among treatment firms are also lower by 5.3% and 15.1% respectively relative to the control sample firms. These results reveal the adverse short-term impacts of the industrial cluster policy.

To cross check the quantitative finding with qualitative evidence, the survey respondents for treatment firms were asked to self-evaluate the cluster policy induced performance changes. Consistent with the aforementioned findings, the overwhelming majority reported that their profits and production levels have decreased significantly, while their production costs have risen after relocating into the government created cluster. Such simple analysis, however, does not account for the effects of other firm performance determinants and therefore could not allow to draw ceteris paribus conclusions.

5. Evaluation Methods, Results and Discussions

5.1 Evaluation Methods

Different types of cluster policy evaluation methods have been used in the literature, such as: policy input-oriented methods (Aranguren et al. 2006), case study evaluations (Fromhold-Eisebith and Eisebith, 2008), input–output models (Schaffer, 1999), cost–benefit analysis (Dar and Gill 1998), and econometric models (White et al. 2006). An overview of the strengths and weaknesses of these cluster policy evaluation methods are briefly discussed in Schmiedeberg (2010).In the reviews she indicated that the choice of the specific evaluation method depends on the purpose of the evaluation, the availability of data, and the scope of the cluster policy[viii].

All of the aforementioned evaluation methods except for econometric models suffer from attributional problems because: (i) the effects of the implemented cluster development program may indirectly impact the performance of those firms that were not directly exposed to the program, (ii) other non-cluster policies might also impact the performance of firms that were exposed to the program, and (iii) the impacts of the cluster policy on firm performance might require a longer period to materialize (Schmiedeberg 2010). More importantly, all of the other evaluation methods usually fail to provide counterfactual evidence, which is crucial for explaining causal relationships (White et al. 2006). Econometric models based on reliable counterfactuals and representative data should be able to address attrition issues and to answer the usual counterfactual question "what would have happened without the intervention" (Heckman 2004; White et al. 2006; Angrist and Pischke, 2008, Wooldridge, 2009).

The 'with-without comparison approach,' the 'before-after comparison approach,' and difference-in-difference approach/ the two way fixed effect model[ix] are widely used empirical tools for evaluating the impacts of government policy. The with-without approach is a post-intervention comparison of the performance of treatment and control samples that may not truly reflect policy effects as it can be biased by asymmetrical exogenous shocks that influence the control group in a different way than the treatment group. More importantly, post-intervention comparisons of treatment and control firms are vulnerable to self-selection bias because the factors that influence program participation might also influence the performance of the participants (see Blundell and Costa Dias 2000). Similarly, before-after comparisons might not yield consistent and unbiased estimates of policy impacts, even if the effects of observable firm performance determinants are controlled for. Such a simple comparison is highly likely to be tainted by temporal firm performance trends or by other confounding factors that occurred between periods (Grossman 1994, Abadie 2003). Accordingly, this study employs the most widely used impact evaluation model (difference-in-difference approach/ the two way fixed effect model), representative firm-

level data, and reliable counterfactual scenarios to quantitatively evaluate the productivity, profitability, innovation and network impacts of the SME cluster development program in Ethiopia. The Aschenfelter and Card (1985) form of the difference-in-difference model was modified by adding a vector of firm performance covariates as follows:

$$Y_{it} = \alpha_0 + \gamma G_i + \lambda T_t + X_{it}\beta_i + \delta(G_i * T_t) + \varepsilon_{it}$$

where G_i , T_t, and $(G_i * T_t)$ denote the group, time, and cluster policy dummy variable respectively, X_{it} represents the vector of entrepreneur- and firm-specific characteristics of firm i at time t, and ε_{it} represents individual transitory shocks.

The coefficient of the interactive dummy δ is the parameter of interest, which represents the difference-in-difference estimate of the average effects of the SME cluster development program. The regression estimate of δ will provide a consistent and unbiased estimate of the average causal effect of the cluster policy if and only if the temporal trends in the absence of the intervention are the same in both groups. This assumption, which is conventionally called the parallel trend assumption, would not hold and thereby the difference-in-difference estimator would be biased, had the pre-policy intervention characteristics of the treatment and control firms were not comparable. As indicated in the previous section, both the treatment and control sample firms were similar in terms of most of their characteristics and performance in the pre-policy intervention period. They were also originally in the same location. Hence, it is less likely that differences in pre-intervention location, firm and entrepreneur characteristics would create nonparallel firm performance dynamics for the firms in the two groups. In addition, the study explicitly accounted for all observable firm- and entrepreneur-specific characteristics and addresses selection bias due to time invariant unobservable. This disentangled the policy impact from observable firm performance determinants and time invariant unobservable confounders but not from time varying heterogeneities. Thus, the model result should be interpreted as the combined effect of the cluster policy and time varying heterogeneities. Nonetheless, the impact evaluation model utilized in the study is expected to produce very consistent and robust results in the present case since a reliable counterfactual is carefully chosen to simulate a natural experiment.

5.2 Estimation Results and Discussions

5.2.1 Impact on Firm Performance

The difference-in-difference model (two-way fixed effects model) results of the industrial cluster policy impacts on firm performance are reported in Table 4. Heteroskedasticity-robust standard errors are reported in parentheses. As shown in the third row of Table 4, the coefficient of the impact variable (interactive term) is highly significant and negative in all of the six firm performance functions, reflecting the adverse effects of the SME cluster development program. In terms of marginal effects, the estimated results suggest that, all other variable held constant, participation in the government cluster development program

significantly decreased the average number of employees of treatment firms by 48% (column i), real value of production by 78% (column ii), profit by 74% (column iii), productivity by 22% (column iv), profitability by 32% (column v), and innovative performance (measured in the number of new designsx) by 57% (column vi). It can be seen from the results in the first row of Table 4 that the time dummy variables are highly significant and positive in all six performance measures.

This suggests that the performance of the treatment firms would have been significantly increased over the three year period, had they not moved to the government created cluster areas. Consistent with the descriptive findings, the coefficient of the group dummy variable, which is reported in the second row of Table 4, is insignificant in all six functions. This suggests that the performance of the treatment and control group firms, in all the six measures, was not significantly different before the government convinced the former to relocate from the "spontaneously originated" cluster to their new location. These findings are consistent with the descriptive findings and the treatment firms' self-assessment results

Martin et al. (2010) also found similar evidence using firm-level data on production and employment for firms that benefited from cluster policy in France and those that did not. To the contrary, Zeng (2008) using data from a government created textile cluster in Mauritius showed that cluster policy improves firm performance. On the other hand, Nishimura and Okamuro (2011) using firm-level data in Japan showed that not every cluster development program contributes to firm performance. They specifically argue that cluster policy will only be effective in improving firm performance if direct policy supports such as R&D subsidies are combined with indirect networking/coordination supports.

The remaining covariates in all of the six functions have shown the expected sign. As expected, firms that record their sales and purchasing transactions outperform those that do not. The coefficients of the spinoff dummy, which indicates whether the current firm owner was a former employee of another footwear manufacturing firm, is positive and significant in the employment, production and profit functions suggesting a positive relationship between prior work experience and firm performance. Consistent with the findings of Gebreyesus and Mohnen (2013), the study finds no evidence that family ties in the industry impact firm performance in all six measures. Firms´ ICT usage, years of operation, managerial experience, general human capital, distance from the nearest main road, and other related firm determinants also show the expected signs, though most of them are not statistically significant.

Table 4 The DID Estimates of the Impacts of the Cluster Development Program

	Log of employment	Log of VA	Log of profit	Log of pfeVA	Log of pfeGP	Log of no. of design
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Time	0.24***	0.46***	0.38**	0.35***	0.36***	0.17*
	(0.06)	(0.10)	(0.13)	(0.07)	(0.10)	(0.07)
Group	-0.02	-0.07	-0.03	-0.03	-0.08	0.31*
	(0.12)	(0.18)	(0.23)	(0.13)	(0.17)	(0.14)
Post x Treated	-0.48***	-0.78***	-0.74***	-0.22*	-0.32*	-0.57***
	(0.11)	(0.17)	(0.21)	(0.12)	(0.15)	(0.11)
ICT	0.16*	0.33**	0.42**	0.14+	0.18	0.41***
	(0.08)	(0.11)	(0.15)	(0.08)	(0.11)	(0.08)
Log (firm age)	0.21***	0.33***	0.33***	0.10**	0.07	0.10*
	(0.04)	(0.06)	(0.07)	(0.04)	(0.06)	(0.05)
Registered	0.18***	0.18+	0.14	0.01	-0.01	-0.04
	(0.05)	(0.10)	(0.13)	(0.07)	(0.09)	(0.07)
Addis_ born	-0.06	0.07	0.05	0.02	0.04	0.03
	(0.06)	(0.11)	(0.14)	(0.07)	(0.09)	(0.07)
Ethnic _Gurage	0.03	-0.08	-0.07	-0.10	-0.13	-0.07
	(0.07)	(0.11)	(0.15)	(0.08)	(0.10)	(0.07)
Previous Manag	0.14*	0.06	-0.05	-0.07	-0.20	0.03
erial experience	(0.06)	(0.11)	(0.15)	(0.08)	(0.11)	(0.08)
spinoff	0.19*	0.22*	0.32*	0.04	0.07	0.12
	(0.08)	(0.11)	(0.16)	(0.09)	(0.12)	(0.09)
Complete 10th	0.13*	0.07	0.05	-0.03	-0.07	0.11
grade	(0.06)	(0.10)	(0.14)	(0.06)	(0.09)	(0.07)
Training	-0.03	-0.05	0.15	-0.07	0.07	0.04
	(0.08)	(0.12)	(0.14)	(0.08)	(0.10)	(0.09)
2nd generation	0.02	0.07	0.07	0.05	0.06	-0.17*
	(0.07)	(0.10)	(0.13)	(0.07)	(0.09)	(0.07)
Father attend	-0.11	-0.26	-0.05	-0.05	0.11	-0.03
formal school	(0.10)	(0.19)	(0.20)	(0.15)	(0.14)	(0.11)
Log of workers'	0.12*	0.27**	0.27*	0.07	0.04	0.11+
experience	(0.05)	(0.09)	(0.12)	(0.06)	(0.08)	(0.07)
Log of distance	-0.10**	-0.23***	-0.25***	-0.10**	-0.09+	-0.15***
to main road	(0.03)	(0.05)	(0.07)	(0.04)	(0.05)	(0.04)
Log of distance	-0.04	-0.14+	-0.14	-0.08	-0.07	0.02
to center of city	(0.05)	(0.08)	(0.11)	(0.06)	(0.08)	(0.05)
Log of distance	0.13**	0.11	0.13	-0.01	-0.04	-0.05
to nearest bank	(0.04)	(0.07)	(0.09)	(0.05)	(0.07)	(0.06)
Log of distance	0.01	0.05	0.02	0.08*	0.07	0.01
to input market	(0.04)	(0.06)	(0.07)	(0.04)	(0.05)	(0.04)
Log of distance	0.00	0.02	0.04	-0.02	0.02	0.10
to output	(0.05)	(0.07)	(0.09)	(0.05)	(0.07)	(0.05)
market						
Association	0.08	0.08	-0.02	-0.03	-0.03	-0.21**
member	(0.06)	(0.10)	(0.13)	(0.07)	(0.11)	(0.07)
Records sales	0.34***	0.20*	0.14	-0.18**	-0.22**	0.26***
	(0.06)	(0.09)	(0.12)	(0.06)	(0.08)	(0.06)
Family tie	0.01	0.02+	0.01+	0.01	0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
N	556	553	548	553	550	555

Notes: Standard errors are shown in parentheses; + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; VA = value added, PfeVa = value added per full-time worker equivalent, pfeGP = gross profit per full-time worker equivalent.

Overall, controlling for the effects of time, site, firm, and entrepreneurial specific effects, the study finds that the SME cluster development program in Ethiopia adversely impacts the job creating capacity, productivity, profitability and innovative performance of the relocated firms probably because the program gives less emphasis on consolidating the functional element of the cluster[xi] Rather the policy highly focuses on nurturing physical proximity among small- and micro-scale footwear manufacturers. As indicated by Boschmn (2005), however, in the absence of such functional elements spatial proximity alone cannot maximize agglomeration externalities and Schmitzian collective efficiency gains.

5.2.2 Transmission mechanisms

In what follows, the various mechanisms that leads to the observed dismal performance of the treated firms are briefly discussed.

A. Intra-Cluster Business Network

The difference-in-difference model results of the network effect of the implemented cluster policy are reported in Table 5. As shown in the third row of the Table, the cluster policy dummy (interactive term) is highly significant and negative in both of the business network equations[xii] which suggests that firms that relocated out of the "spontaneously originated" cluster as a result of the cluster policy are not able to maintain their levels of business activity in the government created cluster. This adversely impacts the performance of the relocated firms as business networks are not only goods-centered linkages, but are also the major channels through which marketing and technical knowledge flow in the Ethiopian footwear cluster (Gebreyesus and Mohnen 2013). The study also finds a positive correlation between the two business network measures and the various firm performance indicators (see Annex 1). This finding is in compliance with the findings of Colman (1988), Maskell et al. (1999), and Giuliani (2007). According to these studies intra-cluster business networks reflect the levels of cooperation, relationship-based trust, collective learning, and exchange of information which all directly impact firm performance. Hence, it is highly likely that the decline in the performance of the relocated clustered firms is triggered by damage to their business networks that had been established in the "spontaneously originated" cluster.

The coefficient of time dummy variable is also highly significant and positive in the backward linkage equation. This suggests that the treatment firms would have been able to intensify their network over the study period, had they remained in the spontaneously originated cluster. On the other hand, the group dummy variable is not significant in the backward linkage equation. This suggests that, both groups of firms were not significantly different in terms of the development of the most important components of their business networks (relationships with input suppliers) before the policy. As expected, the number of years of operation (firm age) has a highly significant and positive relationship with firm business network development. Because it often takes a long time to develop business networks. Similarly the coefficient of the ICT usage dummy variable is positive and statistically

significant in both of the network equations, indicating that firms that use ICT for their business has more highly developed business networks than firms that do not. The spinoff dummy variable is also highly significant and positive in the client equation, indicating that firms own and manage by former footwear industry workers has more highly developed relationships relative to firms with first generation footwear industry owners. As expected, the coefficient of distance from the city is statistically significant and negative in the client equation, indicating that firms located near the city center has more developed business networks than those located farther away. The remaining control variables are not significant.

Table 5 The Impact of the Cluster Policy on the ntensity of Business Network

	Number of Permanent Client	**Number of Permanent Input supplier**
Time	0.48	0.55**
	(0.45)	(0.17)
Group	1.54**	0.26
	(0.49)	(0.21)
Post#Treated	-3.43***	-1.17***
	(0.58)	(0.27)
ICT	1.34*	0.40*
	(0.55)	(0.18)
Log(years of operation)	1.33***	0.25**
	(0.26)	(0.09)
Born in the Capital city	0.84	0.23
	(0.46)	(0.17)
Previous managerial experience	0.43	-0.20
	(0.37)	(0.19)
Spinoff	1.13**	-0.22
	(0.39)	(0.19)
Years of Schooling	-0.08	-0.03
	(0.07)	(0.03)
Attending training	0.28	0.32
	(0.38)	(0.20)
Second Generation	-0.44	0.18
	(0.42)	(0.20)
Log(average worker experience)	0.50	0.34*
	(0.30)	(0.15)
Log(distance from center of city)	-0.76*	0.24
	(0.36)	(0.12)
Association member	0.11	-0.34*
	(0.31)	(0.17)
Family tie	-0.04	0.01
	(0.03)	(0.02)
N	560	560

Notes: Standard errors (VCE) are shown in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; factors that were directly impacted by the cluster policy are omitted

B. Collaborative Knowledge Network

To specifically examine the impact of the cluster policy on collaborative knowledge linkage, both the treatment and control group firm representatives were also asked to indicate the number of input suppliers, output purchasers, and other footwear manufacturers with whom they collaborate on the most important collaborative item (information and experience exchange). In compliance with previous studies such as Giuliani (2007) and Gebreyesus and Mohnen (2013) the number of input suppliers, shoe traders and other similar footwear manufacturers with whom the firm frequently collaborates on information and experience exchange are used to measure the strength of the backward, forward and horizontal knowledge linkages respectively and the sum of the three businesses is used to measure the overall intensity of intra-cluster collaborative knowledge network .The Impact of the relocated cluster policy on the aforementioned collaborative knowledge linkages is estimated by negative binomial regression model and the estimation results are reported in Table 6.

Table 6 Impacts of Cluster Policy on Collaborative Knowledge Linkage

	Backward collaboration	Forward collaboration	Horizontal collaboration	Total collaboration
Treated	-0.28**	-0.26**	-0.32***	-0.29***
	(0.09)	(0.08)	(0.10)	(0.07)
ICT	0.31**	0.00	0.19*	0.19**
	(0.10)	(0.08)	(0.10)	(0.06)
Log(years of operation)	0.23***	0.16***	0.20*	0.20***
	(0.07)	(0.05)	(0.08)	(0.05)
Born in the Capital City	0.10	0.12	-0.06	0.05
	(0.08)	(0.06)	(0.08)	(0.06)
Previous managerial	0.21*	-0.13	-0.03	0.04
experience	(0.10)	(0.08)	(0.09)	(0.06)
Spinoff	0.11	0.02	-0.07	0.01
	(0.09)	(0.08)	(0.09)	(0.06)
Years of schooling	-0.02	-0.00	0.01	-0.00
	(0.01)	(0.01)	(0.01)	(0.01)
Attend training	-0.02	0.07	0.06	0.03
	(0.09)	(0.08)	(0.11)	(0.07)
Second generation	0.05	0.00	0.06	0.04
	(0.09)	(0.07)	(0.09)	(0.06)
Log(average worker	0.07	0.15**	0.05	0.08
experience)	(0.08)	(0.06)	(0.07)	(0.05)
Log(distance from city center9	-0.03	0.09*	0.07	0.04
	(0.06)	(0.04)	(0.06)	(0.04)
Log(distance from main road)	0.04	0.06*	0.05	0.05
	(0.04)	(0.03)	(0.04)	(0.03)
member	-0.01	-0.10	-0.30**	-0.15*
	(0.08)	(0.06)	(0.10)	(0.06)
Family tie	-0.00	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)
N	280	280	280	280

Notes: Standard errors are shown in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; collaboration is measured in terms of the number of input suppliers, output buyers, and other footwear manufacturers on information and experience exchange

As shown in the first row of Table 6, the estimation results again disclose a negative relation between the cluster policy and the intensity of intra-cluster collaborative knowledge networks. It specifically uncovers that firms who relocated to the government created cluster have much less developed intra-cluster collaborative knowledge networks in all four of the collaborative knowledge network measures. This may explain part of the observed performance gap between the treatment and control group firms because collaborative knowledge networks affect firm performance. The correlation matrix results which is reported in Annex 1 (the last four rows) indicate a positive association between the status of collaborative networks and firm performance, which is consistent with the findings of Giuliani 2007 and Gebreyesus and Mohnen 2013.

To further explore the collaborative network effect of the cluster policy, both the treatment and control groups' firm representatives were also asked to indicate their firms 'extent of collaboration on information and experience exchange as well as on other twelve potential forms of collaboration with (i) other shoe manufacturers, (ii) input suppliers, and (iii) clients.

Table 7 Percentage of Shoe Manufacturers that Collaborated Frequently with Similar Firms in the Leather Shoe Industry in Ethiopia

Areas of cooperation	Control	Treatment	P-value §
Information and experience exchange	82	66	0.004**
Quality improvement	59	53	0.350
Setting product specifications	34	27	0.240
Money lending/borrowing	29	15	0.012*
Design sharing	8	2	0.083
Worker sharing	1	0	0.508
Machine and equipment Sharing	6	1	0.044*
Order sharing	1	0	0.348
Joint purchasing of raw materials	5	1	0.151
Joint sales of outputs	1	12	0.152
Joint sales promotion	0	0	.
Joint training	0	0	.
Borrowing raw materials	6	0	0.025*

Note: The last column reports the P-values associated with the two sample tests of proportion, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The percentage distributions of both groups that reported frequent collaboration on the various forms of collaboration with other shoe manufacturers are reported in Table 7. As shown in the first row of the Table, the percentages of treatment group firms that reported

collaborating frequently with other shoe manufacturers on information and experience exchange, money lending, machine and equipment sharing, and raw material borrowing were significantly lower than for the control group firms. The percentages of treatment group firms that collaborated frequently with other shoe manufacturers on quality improvement, product specifications, and design sharing were also lower than for the control firms, even though these differences is not significant at 0.05 level.

Similarly, as shown in Figure 1, the percentages of treated firms that have collaborated frequently with input suppliers on most of the specified collaborative measures are much lower than the percentages of control firms. Less than a third of the treatment group firms report collaborating frequently with input suppliers on information and experience sharing, while more than half of the control firms report collaborating frequently with input suppliers in this regard. Only less than one-fifth of the treatment group firms' collaborate frequently on payment negotiations and delivery conditions with input suppliers, while more than two-fifths of the control group firms reports doing so. In addition, while only 13% of the treatment group firms reports collaborating frequently on quality improvement and 15% on product specifications, among the control group firms these percentages are 31% and 23% respectively. These differences are statistically significant, reflecting the negative consequence of the policy on intra-cluster collaboration.

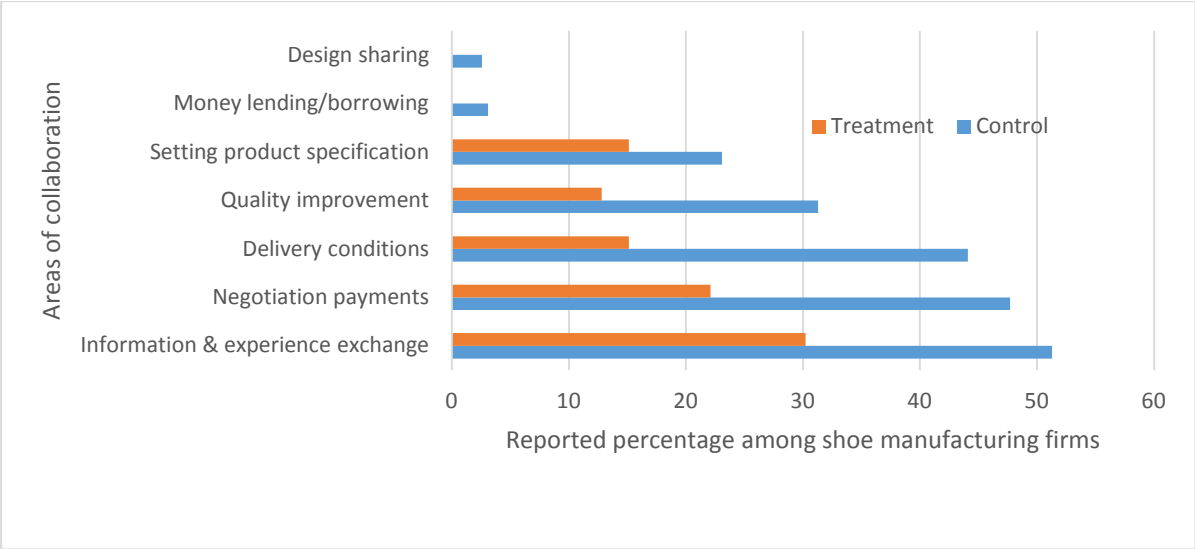

Figure 1 Percentages of Shoe Manufacturers that Collaborated Frequently with Input Suppliers in the Leather Shoe Industry in Ethiopia

The investigation of the extent of shoe manufacturer collaboration with shoe buyers also indicates that the treatment group firms have less developed linkages with shoe traders compared to firms that remained in the "spontaneously emerged cluster in Mercato (see Figure 2).

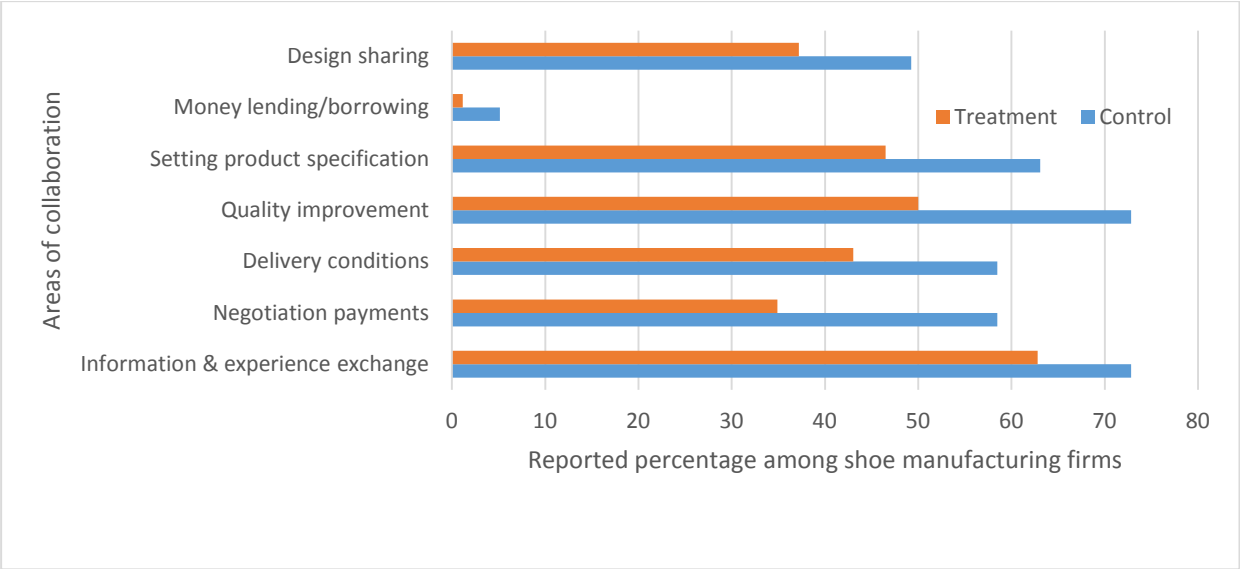

Figure 2 Percentages of shoe manufacturers that collaborated frequently with shoe traders in the leather shoe industry in Ethiopia

All of these findings suggest that the Ethiopian SME cluster development policy fails to intensify intra-cluster collaborative knowledge networks among the relocated (treatment) firms and thereby adversely impacts the performance of clustered firms that moved to the government created cluster areas. These results implicitly suggest that the building and transfer of working premises alone do not generate agglomeration benefits. Thus to improve the performance of the treated firms the government should also create a mechanism to intensify their collaborative knowledge and business network with other shoe makers, downstream input suppliers and upstream shoe traders.

C. Collective Efficiency Gain: Joint Action

The cluster policy in Ethiopia also fails to help the treatment group firms benefit from active collective efficiency gains. As it can be inferred from Table 7, Figure 1, and Figure 2, extremely low percentages of treatment group firms reportes collaborating frequently on: (i) joint marketing and training; (ii) order, design, worker, machine and equipment sharing; and (iii) raw material borrowing with other producers, downstream input suppliers and upstream output buyers. However, since it is highly likely that the social marginal return of initiating such joint actions is much higher than the private marginal return and the social marginal cost, it is optimal for the government to initiate a platform for joint action in matters of common interest, such as joint procurement of raw materials (directly from tanneries, sole factories, etc.), joint sales of outputs (to public companies, export markets, etc.,), and joint training. For example, the government, in collaboration with local trade associations in the Guadalajara and Leon footwear clusters of Mexico organized trade fairs and promoted the participation of clustered firms in international exhibitions, and assisted clustered firms to cooperate in matters of common interest (Rabellotti 1995, 1999). Similar efforts have not been made in Ethiopia. As it can be inferred from the results presented in Annex 2 , the overwhelming majority of the clustered treatment group firms reported that neither the

government nor their association support them in the creation of a platform for joint training, joint procurement of raw materials, or joint sales and advertisement of their products. Hence, the treatment group firms do not benefit from intra-cluster collective efficiency gains.

D. Extra-Cluster Trade and Knowledge Linkage

Empirical studies such as Gunawana et al (2015) have found that both intra-cluster and extra-cluster networks have positively associations with the performance of small- and micro-scale manufacturing enterprises in emerging economies. While intra-cluster networks foster collective learning and the flow of information, extra-cluster networks facilitate the flow of new knowledge (Giuliani and Bell 2005, Gunawana et al 2015). Hence, cluster policy could affect firm performance through consolidation of linkages between clustered firms and distant markets and relevant knowledge centers. The relocated cluster policy in Ethiopia, however, has failed to bring such effect. That is the cluster policy do not help to link even the targeted firms to public knowledge centers such as the government owned Leather and Leather Product and Technology Institute, which was established in 2004 to develop the technical and managerial capability of the leather and leather product industries. It neither help to link the treated SMEs to the local large-scale shoe factories. According to EIFCCOS officers, only recently have efforts been initiated to start a subcontracting arrangement between firms in the government created cluster and the Chinese owned Huajian shoe factory. All this contributes to the dismal performance of the treated firms and unveils the failure of the SME cluster policy in Ethiopia.

E. Other Missing Functional Elements of the Cluster

There are other important functional elements missing from the Ethiopian government created footwear cluster .Only a few of the treatment group firms obtains product designs, equipment and machinery, and maintenance services from specialized workshops in the government created cluster, while the vast majority of the control group firms are able to obtain such services in the “spontaneously originated” cluster. The absence of such workshops in the government created cluster could cause technological discontinuity (Schmitz and Nadvi 1999) and reduce intra-cluster specialization. As it can be inferred from table 8, the cluster policy also aggravates most of the major factors impeding growth of small and micro enterprises in Ethiopia, though it minimizes the working premise problem of the relocated firms. The mean severity scores of the treatment and control group firms associated with the small firm growth problems were modest for both groups in the pre-policy intervention period. However, in the post intervention period lack of trust, customer and supplier search and access costs, input and output transportation costs, lack of quality raw materials, delays in the supply of raw materials, and the lack of information become more severe problems for treatment group firms relative to the control firms.

Table 8: The Mean Value of Small firm Growth Constraint Indicators

	Before (2010)		After (2013)	
Potential growth barriers	**Control**	**Treatment**	**Control**	**Treatment**
Lack of trust among supply chain actors	2.6	2.5	2.3	3.1
High customer search and access costs	2.4	1.8	2.2	3.0
High supplier search and access costs	1.6	1.0	1.5	2.2
High input transportation costs	0.6	0.5	0.7	3.3
High output transportation costs	0.6	0.5	0.7	3.4
Lack of market information	3.4	2.5	2.4	2.9
Working capital constraints	4.4	4.5	4.4	4.5
Poor quality of raw materials	3.2	3.1	3.2	3.2
Delays in supply of raw material	2.7	2.2	2.2	2.8
Lack of skilled labor	2.7	1.8	2.4	3.5
Lack of adequate work facilities	4.3	4.1	4.5	1.1
High rental cost of work facilities	3.9	4.3	4.3	0.7
Insufficient electrical power for production	3.4	2.9	3.2	2.4
Poor telecommunication services	2.4	2.4	3.0	2.6
Tax administration	1.8	1.2	3.2	0.1
High taxes	0.8	0.9	3.0	0.3
Corruption	1.9	0.7	2.3	0.3

Note: The treatment and control group firm representatives evaluated how problematic each of the listed problems are for the operation and growth of their own firms on a six-point ordinal scale where "0" denotes no problem and "5" denotes a very severe problem.

On the other hand, the lack of adequate working facilities, high rental costs, high taxes, poor tax administration, corruption, and insufficient power supply become less severe problems for the treatment group firms in the post intervention period. Hence, even though the footwear cluster development program has solved the working space limitations of the treatment group firms, it fails to produce the envisaged benefits of industrial clustering because most of the functional elements of an industry cluster are missing in the government created cluster.

In addition, the cluster policy has not brought the expected degree of specialization among the treated firms. The analysis of the survey data indicated that almost all of the treated firms are still engaged in the entire shoe manufacturing process. All these contributes to the low performance of the treated firms.

F. Perceived Causes of Changes in Firm Performance: Respondents Self-Evaluation

The majority of the treatment group entrepreneurs reported that their productivity, production capacity, and profit have declined significantly after they relocated into the government created cluster[xiii] and they attributed the observed performance declines to: (i) the difficulty of finding skilled labor,[xiv] (ii) the absence of input suppliers that can meet quality and specification requirements, (iii) the lack of large markets for their product in the government created cluster or its vicinity,[xv] and (iv) the government's failure to commit to

the release of pledged financial support (including the return of 30% deposits made by the firms).

Most entrepreneurs stressed the importance of financial constraints. According to the respondents, even though the government initially pledged to provide them with a generous financing scheme, such as longer grace periods, longer debt repayment periods, lower interest rates, and loans of up to 70:30 debt: equity ratio for investment finance with no additional collateral requirements, it fails to follow through with these financing schemes even three years after the firms relocated to the government cluster. This further highlights the failure of the cluster policy to achieve the very benefits it intended to produce.

Consistent with their responses to the observed performance trend issues, for the vast majority of the relocated firms believe that lack of access to specialized labor, distance to input and output markets and lack of machine service provider in the vicinity of their workshop are the major location disadvantage of operating in the government created cluster areas relative to the spontaneously originated cluster area. All these explain why firms that moved to the government created cluster performs less than those that stayed in the spontaneously originated cluster.

6. Concluding Remarks

Following the growing optimism in the cluster literature concerning the growth, export and employment prospects of SMEs, the Ethiopia government has implemented a SME footwear cluster development program since 2011. This program was designed not only to solve the working facility limitations faced by most clustered shoe manufacturers but also to maximize the benefits of industrial clustering. Accordingly, this study evaluates whether or not the program succeeded in achieving these stated objectives based on representative firm-level data and analyses paired with reliable counterfactual scenarios. The impacts of the cluster development program on firm productivity, profitability, innovation, and networks are examined using firm-level data that were collected from 86 randomly selected clustered leather shoe manufacturers that have directly benefited from the program and another 196 clustered firms that did not, both before and after the implementation of the cluster policy.

After controlling for selection bias, endogenous location choices, as well as the effects of time-, firm-, and entrepreneur-specific factors, the study finds that the SME footwear cluster development program in Ethiopia has negative impacted the job creation, productivity, innovative performance, and the profitability of treatment group firms. In terms of marginal effects, the estimated results suggest that, everything else remains the same, being relocated into the government created cluster significantly decreases the average number of firm employees by 48%, real value added by 78%, profit by 74%, productivity by 22%, profitability by 32% and innovative performance by 57%.

The observed performance decline of the treated firms is mainly attributable to the lack of important functional elements within the government created clusters. The quantitative analyses revealed that the relocation of clustered shoe manufacturers from the "spontaneously originated" cluster to the government created cluster not only weakened the market linkages and collaborative knowledge networks of the relocated firms along the shoe supply chain but also aggravated most of their growth constraints, even though relocation has solved working facility limitations. The lack of trust, high customer search and access costs, high input and output transportation costs, lack of market information, delays in the supply of raw materials, and the lack of skilled labor become even much more severe for the treatment group firms. However, given the short span of the program these results reflect short-term impacts of the program. The lag time between policy intervention implementation and its impacts may conceal the long-term impact of the cluster policy. The overwhelming majority of the representatives of treatment group firms also continue to believe that their performance will improve over time as a result of their participation in the MSE cluster development program.

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Annex

Annex 1: Correlation between Firm Performance and Network Density

Network Indicators	Firm Performance Indicators						
	Ln(VA)	**Ln(PfeVA)**	**Ln(GP)**	**Ln(pfGP)**	**Ln(Π)**	**Ln(pfe Π)**	**Ln(design)**
Number of Permanent Client	0.064	0.024	0.068	0.039	0.061	0.023	0.192
Number of Permanent Supplier	0.194	0.099	0.181	0.0896	0.171	0.088	0.211
Backward linkage	0.036	0.024	0.055	0.0527	0.064	0.048	0.135
Forward Linkage	0.319	0.133	0.308	0.1297	0.294	0.133	0.216
Horizontal linkage	0.276	0.110	0.252	0.0867	0.225	0.072	0.079
Total collaborator	0.214	0.094	0.217	0.1074	0.210	0.098	0.191

Note : VA, GP, Π, design, pfeVA, pfeGP, ,pfeΠ, stands for value added, gross profit, net profit, number of new design ,Value added per full time equivalent worker, gross profit per full time equivalent worker, net profit per full time equivalent worker respectively .Ln stands for the logarithmic value of the respective variable

Annex 2 : Percentage of Firms who received the listed Service

List of Services	Business Association		Government	
	Treated	Control	Treated	Control
Provide mechanism for joint training	15	10	5	6
Provide mechanism for joint marketing	4	3	0	1
Provide platform for joint business promotion	1	2	1	0.5
Facilitate access to finance	5	2	7	5
Low tax			8	2
Facilitate access to land	36	5	37	14
Lobbying government	21	0		

Note: All treated firms except one and 110 out of the 195 control firms are members of business association.

Annex 3: The Percentage distribution of the relocated firms indicating the advantage of their previous location (spontaneous cluster) over the new location (government cluster)

Advantage of being located in Mercato over	Yeka	Rimo	18Mazoria
	Percentage of firms		
Better access to Skilled labor	70	71	33
Proximity to Raw material supplier	83	86	50
Proximity to Machine service provider	20	29	0
Proximity to customer	85	79	83
Cheap rent of Working Premise	-	-	-
Access to larger working premise	-	-	-
Proximity to other Shoe Makers	6	7	0
Better access to designer	2	0	0

Notes

[i] In 2012 the average exchange rate of 1 USD = 18.ETB

[ii] According to Ali (2012), there are three types of government-created cluster in Ethiopia: established clusters, expansionary clusters and relocated clusters.

[iii] EIFCCOS is the largest and the most active cluster cooperative company. It is formed by 1,000 SMEs, input suppliers, shoe retailers, and wholesalers.

[iv] *Woreda* is the second largest administrative unit in Ethiopia and is more or less equivalent to a district.

[v] Mercato is the largest open market in Africa, located at the western part of the capital city of Ethiopia.

[vi] Shoe manufacturers produce differentiated products such as men's, children's, women's, leather, and synthetic shoes. The computation of the output based productivity measure was possible since the dataset comprises of firm-specific price and quantity data for each variety of shoe produced by each sample firm

[vii] This suggests that average performance with respect to all of the aforementioned measures for both groups of firms would have been similar over time in the absence of the cluster policy because the dynamics of firm performance are thought to be highly influenced by pre-treatment characteristics (Abadie 2003).

[viii] Except for the cost-benefit approach, all of the other evaluation methods only take into account the impacts of the policy measure without considering the intervention costs. However, to investigate the cost effectiveness of the cluster policy impacts the social costs and benefits or intervention costs must be considered (Dar and Gill, 1998). Theoretically, the social cost-benefit approach is an appropriate evaluation method as it makes use of both the estimated impacts and explicitly calculated intervention costs. However, empirical application of this approach is limited due to its complexity and data requirements, especially for cluster policy impact assessments because many of the impacts of the cluster policy are indirect, hybrid, and/or multidimensional (Spackman 2007, Schmiedeberg 2010). In addition, it is very difficult to define the social discount rate, which is a key parameter in cost-benefit analysis. It is also very difficult to measure most of the benefits and costs of industrial clustering in monetary units.

[ix] The two way fixed effect and the difference in difference model yields similar results in the present context because the same firms are observed in two rounds (balanced panel data).

[x] In the footwear industry design is the source of differentiation and hence it is the integral part of innovation(Gebreyesus and Mohnen, 2013)

[xi] Martin and Sunley (2003) mentioned two dimensions of a cluster: geographical and functional. The former refers the physical co-location of similar or interconnected firms. The latter refers the presence of trust, extent of collaborative knowledge network, and the strength of forward, backward and horizontal business linkages among firms in the cluster.

[xii] In this study the status of business networks was measured in terms of the number of clients (shoe buyers) and input suppliers with whom the firm has permanent relations following Gebreyesus and Mohnen (2013).

[xiii] However, more than 95% of them still expects a higher future benefit.

[xiv] Since the overwhelming majority of experienced workers lived far from the government created cluster, the relocated firms were compelled to provide lunch subsidies and transportation allowances for their workers.

[xv] They still sell outputs and purchase inputs from their previous suppliers in Mercato area of the capital.