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Analysing the Incidence of Labour Cost on Organic Production: Implications on Competitiveness

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Abstract

International trade of organic food has increased dramatically over the last decades and it is dominated by a South-North relationship in which small farms of the South hemisphere export their production to countries of the North. These farms are currently facing important challenges in this relationship that negatively affect their ability to compete in international markets of organic goods. It is argued that the use of family labour can help farmers of the South to gain competitive advantage. The objective of this article is to present a counterargument based on the idea that the use of family labour is not feasible in some countries of the South given the nature of their rural labour market. This counterargument is supported by a case study.

Keywords: Labour Cost; Organic Production; Competitiveness.

1. Introduction

In spite of the minor share of the world food market, global organic sales have traditionally been growing at an annual rate of 20% in major North American and European markets, and this growth has been led by consumers (Yussefi & Willer, 2003). As a result of this growth, the organic agrifood system has been transformed from a local network of producers and consumers to a formal regulated globalized trade system (Raynolds, 2004). This system is characterized by a South-North relationship in which suppliers from the South (i.e. Australia, New Zealand, South Africa and Latin America) export their organic production to mayor consumers in the North (i.e. Europe, US and Japan).

According to Raynolds (2004), an important element associated with this South-North trade relationship is certification (formal standards, monitoring, and labelling) which has been introduced with the purpose of satisfying national and international organic standards. One of the aims of this certification for South countries is to secure a place for traditional exports in response to the increasingly competitive international markets. Ensuring a place makes it possible to diversify production by poor producers reducing in this way livelihood vulnerability (Bacon, 2005). In considering this paradigm, it is important to mention that the mainstreaming of organic foods in Northern markets has critical implications for the governance of international supply networks. That is, mayor players such as supermarkets in North countries are significantly large implying that they have the power to dictate the terms for organic food suppliers. For example, in the United Kingdom three retailers control the food markets being Tesco and Sainsbury the dominant ones each commanding over 30% of organic sales (Morgan and Murdoch, 2000; Rowan, 2000; Burt and Sparks, 2003; Wood et al., 2006; Hughes et al., 2009; Stelder, 2012). In this context, certification represents a powerful form of network governance that contributes in accentuating traditional economic inequalities between firms and countries. That is, expensive organic certification requirements constitute a major barrier to entry for small scale producers from areas such as Latin America wishing to enter organic

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export network and encourage the growth of large scale corporate producers (Raynolds, 2004; Jaffee and Howard, 2010).

In addition to the barriers that certification imposes to small producers of organic goods, these producers also face important disadvantages in terms of the productive process of these goods. Firstly, organic yields are lower than traditional yields, and organic yields in developing countries are lower than organic yields in developed countries (Karlen et al., 1995; Nguyen and Haynes, 1995; Sorby, 2002; Pimentel et al., 2005; Seufert et al., 2012). According to Seufert et al. (2012), one of the main factors explaining this difference corresponds to farmers' ability to carry out appropriate managerial practices. Secondly, because small producers in the South normally operate in small scales, they face higher unitary cost than large commercial farms (Poulton et al. 2010).

A potential strategy that has been proposed to help small farmers to overcome to some extent some of the problems outlined above is to reduce costs by employing family labour. In this regard, Poulton et al. (2010) explains that small farmers of organic goods have competitive advantage over large commercial farms because the former incur in lower transaction costs in accessing and supervising motivated family labour. The objective of this article is to present a counterargument based on two ideas. Firstly, the production of organic goods cannot depend solely of family labour because this production is labour intensive (Granatstein, 2003). Secondly, rural labour in some countries is scarce implying that the use of non-family labour in the production of organic goods can dramatically increase production cost negatively affecting the competitive position of small organic farmers. In order to support this counterargument, small farmers in Chile were used as a case study.

Agriculture in Chile corresponds to an economic activity that is characterized by high seasonal variation. In summer, the demand for labour increases sharply and in autumn-winter it decreases significantly. Most of this labour force corresponds to unskilled workers who also seek alternative opportunities in other sectors (e.g. building and services) in order to obtain better wages (Campos, 2011).

According to Otero and Soto (2013), 80% of rural workers are concentrated between the regions of Atacama and Los Lagos of this country and correspond to about 524,464 farmers who work as employees. In considering this figure, these researchers argue that there is a deficit of about 40,000 at the country level. In terms of regions, the region with the highest deficit (accounting for about 10,000 workers) is Maule. Other relevant regions in terms of rural labour deficit are Bío - Bío (7,400 workers); Los Lagos (5,800 workers); Valparaíso (5,000 workers); Coquimbo (3,000), Araucanía (2,300); and O'Higgins (1,500). According to ODEPA (2013), the organic sector in Chile, even when having a small size (i.e. 12,500 ha), has also been affected by the deficit of labour in rural areas. Given the nature of the rural labour market in Chile, this country constitutes a suitable study case to support the counterargument proposed in this article.

This article is organised as follows. Section 2 describes the methodology adopted in this investigation. Section 3 presents the results. Finally, Section 4 discusses and concludes.

2. Material and Methods

In order to support the counterargument offered in this article, the incidence of labour cost in the productive process of key organic goods in Chile was considered. These goods are raspberry, blueberry, kiwi, and asparagus (information about these agricultural goods in Chile is presented in Appendix A). For the case of raspberry, the current investigation was based on a representative farm located in the Community of Coihueco in the Bío-Bío region of Chile. For kiwi and asparagus, the present study was based on representative farms located in the Community of San Carlos in the same region. Finally, for blueberry, a representative farm located in the in the locality of Paine of the Metropolitan region was considered (the investigation was focused on the production of the varieties Star and Legacy).

The four farmers considered in the current investigation were studied using their cost structure over a period of 10 years from the establishment of the corresponding agricultural good. Their cost structure was split in terms of *labour cost* and *others* with the purpose of obtaining the following productivity indicators

associated with the labour employed in each of the agricultural goods considered in this study: (i) Yields in kg/ha/Year; (ii) total cost in US$/kg; (iii) unitary cost in US$/kg; (iv) labour employed in the field in working man day (WD) per ha/year; (v) labour productivity in kg/WD; (vi) incidence of labour costs expressed as percentage of labour costs per ha with respect to total cost per ha; (vii) labour cost in US$/WD; and (viii) productivity per labour cost in kg per US$ paid to labour during the season (Working machinery day is referred in this article as WM).

These indicators are presented in specific tables per each good. They also include information about investment, fixed costs, machinery costs, and input costs. In addition, these tables were used to compare the indicators of productivity and cost incidence of the four agricultural goods under study.

3. Results

The results obtained for the four selected agricultural goods are presented as follows.

Blueberry

The indicators of productivity and cost for organic blueberries obtained in the current investigation are presented in Table 1.

Table 1: Productivity and Cost Indicators for Organic Blueberries Produced In Chile (Exchange Rate: $473.25/US$)

INDICATORS	Quantity	Units	Value	Unit	Percentage
Yields (years 7−10)			14,000	Kg/ha	
Planting density			4,100	Units/ha	
Investment			52,120.4	US$/ha	
PRODUCTION COSTS (years 7−10, except fixed costs)					
Cost of Labour	737,5 6,9	WD MD	22,492.3	US$/ha	74.7%
Cost of machinery activities			437.4	US$/ha	1.5%
Cost of fertilisers			1,677.6	US$/ha	5.6%
Cost of pests and diseases control			104.6	US$/ha	0.3%
Fixed costs			5,398.8	US$/ha	17.9%
Total costs per ha			30,109.8	US$/ha	100.0%
Unitary cost			2.2	US$/ha	

Source: Developed by the authors.

According to this table, the yield that is obtained from an initial investment of US$ 52,120 reached 14 tonnes/ha. The most relevant variable cost is labour accounting for 74.7% of the total annual cost. This corresponds to an annual amount of US$ 22,491.3 used to pay 737.5 WD/ha in full production. This figure is consistent with that found by Luengo (2010) in a study carried out in the Chillan city located in a southern region of the country. In particular, this researcher found that 80% of the variable cost for the production of organic blueberry corresponds to labour. Most of the labour involved in the production of organic blueberries is employed in harvesting this good. Finally, the study revealed that the unitary cost for this agricultural good is US$ 2.2/kg which is significantly larger than the figure of US$ 1.15 found by Luengo (2010) for the period 2008-2009.

Kiwi

The indicators of productivity and cost for organic kiwi obtained in the current investigation are presented in Table 2.

Table 2: Productivity and Cost Indicators for Organic Kiwi Produced In Chile (Exchange Rate: $473.25/Us$)

INDICATORS	Quantity	Units	Value	Unit	Percentage
Yields (years 6−10) Planting density Investment			30,000 800 21,381.9	Kg/ha Units/ha US$/ha	
PRODUCTION COSTS					
Cost of Labour (years 7−10) Cost of machinery activities (years 5−10) Cost of fertilisers Cost of pests and diseases control Fixed costs Total costs per ha Unitary cost	343,0 15,3	WD MD	9,500.3 1,611.2 4,122.6 159.8 2,115.0 17,506.8 0.6	US$/ha US$/ha US$/ha US$/ha US$/ha US$/ha US$/ha	54.3% 9.2% 23.5% 0.9% 12.1% 100.0%

Source: Developed by the authors.

This table shows the following information. The density of units corresponds to 800 units/ha; the yield is equal to 30 tonnes/ha; and the level of investment corresponds to US$ 21,381.9/ha. The cost of labour account for 54.2% of the annual total cost corresponding to 9,500.3 (343 WD/ha), and 17% are due to harvest labour. The estimated unitary cost is US$ 0.6/kg.

Raspberry

The indicators of productivity and cost for organic raspberry obtained in the current investigation are presented in Table 3.

Table 3: Productivity and Cost Indicators for Organic Raspberry Produced In Chile (Exchange Rate: $473.25/US$)

INDICATORS	Quantity	Units	Value	Unit	Percentage
Yields (years 10) Planting density Investment			22,000 7.575 26,772.3	Kg/ha Units/ha US$/ha	
PRODUCTION COSTS					
Cost of Labour (years 8−10) Cost of machinery activities (year 10) Cost of fertilisers (year 10) Cost of pests and diseases control (year 10) Fixed costs Total costs per ha (year 10) Unitary cost (year 10)	768,7 5.7	WD MD	19,636.6 598.0 545.9 193.6 2,113.0 23,087.1 1.0	US$/ha US$/ha US$/ha US$/ha US$/ha US$/ha US$/ha	85.1% 2.6% 2.4% 0.8% 9.2% 100.0%

Source: Developed by the authors.

This table shows that the density of units is 7,575 units/ha and the yield in year 10 correspond to 22 tonnes/ha. The level of investment is equal to US$ 26,772,3/ha; the cost of production in year 10 corresponds to US$ 26,772.3/ha; and the unitary cost is US$ 1.0. The cost of labour employed in the production of raspberry involves a significant proportion of the total costs accounting for 85% of the annual total costs. This equates a value of US$ 19,636.6 corresponding to 769 WD/ha in full production.

Asparagus

The indicators of productivity and cost for organic asparagus obtained in the current investigation are presented in Table 4.

Table 4: Productivity and Cost Indicators for Organic Asparagus Produced In Chile (Exchange Rate: $473.25/US$)

INDICATORS	Quantity	Units	Value	Unit	Percentage
Yields (years 8−10)			10,000	Kg/ha	
Planting density			26.500	Units/ha	
Investment			9,878.5	US$/ha	
PRODUCTION COSTS					
Cost of Labour (year 10)			4,720.5	US$/ha	71.5%
Cost of machinery activities (year 10)			798.7	US$/ha	12.1%
Cost of fertilisers (year 10)			309.5	US$/ha	4.7%
Cost of pests and diseases control (year 10)	768,7 5.7	WD MD	244.8	US$/ha	3.7%
Fixed costs			528.3	US$/ha	8.0%
Total costs per ha (year 10)			6,601.8	US$/ha	100.0%
Unitary cost (year 10)			0.7	US$/ha	

Source: Developed by the authors.

This table shows that the plating density of organic asparagus is 26,500 units/ha and the yield corresponds to 10 tonnes/ha in year 10. The level of investment is US$ 9,878.5/ha; the total cost is equal to US$ 6,601.8 in year 10; and the unitary cost corresponds to US$ 0.7/kg. The most relevant variable cost for organic asparagus is labour accounting for 71.5% of the total annual costs. This equates an annual amount of US$ 4,720.5 for an assignation of 178.6 WD/ha in full production of which 38% are workers working in harvest activities.

Aggregate Comparative Study

The following table shows the indicators of productivity and labour costs for the four agricultural goods considered in this study.

Table 5: Productivity Indicators and Labour Costs of the Four Organic Agricultural Goods Produced In Chile.

Indicator	Blueberries	Kiwi	Raspberries	Asparagus
WD/ha/year	737.5	343.0	768.7	178.6
Labour productivity (kg/WD)	18.9	87.5	28.6	56.0
Percentage cost of labour ha/ total cost ha (%)	74.7	54.3	85.1	71.5
Cost per WD (US$/WD)	30.5	27.7	25.6	26.4
Productivity per US$ paid to labour	0.6	3.2	1.1	2.1
Yield/ha (kg/ha)	14,000.0	30,000.0	22,000.0	10,000.0

Source. Developed by the authors

According to this table, berries employ the highest quantity of labour (in terms of wd/ha/year) during the stabilisation period with levels between 700 wd and 800 wd. The highest productivity in kg/wd is observed in kiwi accounting for 87.5 kg/wd. On the other hand, the highest productivity per US$ spend in labour is observed in kiwi and asparagus accounting for 3.2 and 2.1 kg/US$, respectively.

4. Discussion and Conclusions

For the four agricultural goods considered in this study it was found that labour cost is the most important component of total cost being berries the item with the highest labour cost incidence (about 80% on average). These figures are significantly higher than the one found by Rodríguez and Kern (2009) for organic apple (i.e. 27% of the total cost). Likewise, the values of the incidence indicators found in the present study are larger than the 43.6% incidence of labour cost found by Rodríguez and Kern (2010) for organic wine grapes.

This finding not only supports the counterargument offered in this article, but also shows that the cost of labour is the most relevant in the production of the selected organic goods. This implies that labour in Chile is a source of comparative disadvantage contradicting the view of Poulton et al. (2010) who argues that small farmers of organic goods have competitive advantage over large commercial farms as a consequence of family labour.

Possible alternatives that small farmers in countries having similar rural markets may adopt are described as follows. Firstly, the formation collaborative alliances may help small farmers to reduce unitary cost by means of economies of scale. Secondly, participation in formal cooperatives may help them to gain negotiation power and to counterbalance the power imbalance exercised by strong retailers located in the North. However, it is important to highlight the fact that these strategies may not be effective in organic goods with extremely high labour cost such as berries. In these cases major rural reforms such as the introduction of policy programs to prevent emigration from rural areas are needed. The analysis of whether this is a feasible alternative is left for future research.

References

Bacon, C., 2005. Confronting the Coffee Crisis: Can Fair Trade, Organic, and Specialty Coffees Reduce Small-Scale Farmer Vulnerability in Northern Nicaragua? World Development 33(3): 497-511.

Burt, S.L. and L, Sparks, 2003. Power and Competition in the UK Retail Grocery Market. British Journal of Management 14(3): 237–254

Campos, J., 2011. Macroeconomía y Agricultura Chilena. ODEPA-Chile.

Brumfield, RG., Rimal A. and S. Reiners, 2000. Comparative cost analyses of conventional, integrated crop management, and organic methods. HortTechnology 10: 785-793.

Granatstein D., 2003.Tree Fruit Production with Organic Farming Methods. Wenatchee (WA): Center for Sustaining Agriculture and Natural Resources,Washington State University.

Jaffee, D. and P.H. Howard, 2010. Corporate cooptation of organic and fair trade standards. Agriculture and Human Values 27(4): 387-399.

Hughes R., Clarke G.P., and A. Hallsworth, 2009. Testing the effectiveness of the proposed UK Competition test. The Service Industry Journal 29(5): 569-590

Karlen, DL., Duffy, MD. and T.S. Colvin, 1995. Nutrient, labor, energy, and economic evaluations of two farming systems in Iowa. Journal of Production Agriculture 8: 540-546.

Kern, W. and J. Rodríguez, 2010. Evaluación Comparativa de Costos Unitarios de Operación de Sistemas de Producción Orgánica y Convencional de Uva CV. Chardonay en el Valle de Casablanca. 61 Congreso Agronómico, Sociedad Agronómica de Chile, Chile.

Luengo, F., 2010. Análisis de Costos de Producción de Arándanos (Vaccinium corymbosum I.) en la Zona Centro Sur de Chile: Estudio de Caso. Memoria Presentada a la Facultad de Agronomía de la Universidad de Concepción para Optar al Título de Ingeniero Agrónomo.

Morgan, K. and J. Murdoch, 2000. Organic vs. conventional agriculture: Knowledge, power, and innovation in the food chain. GeoForum 31: 159–173.

Nguyen, M.L. and R.J. Haynes, 1995. Energy and labour efficiency for three pairs of conventional and alternative mixed cropping (pasture-arable) farms in Canterbury (New Zealand). Agriculture, Ecosystems and Environment 52: 163-172.

ODEPA, 2012. Estudio Estimación y Caracterización de la Demanda de la Mano de Obra Asociada a la Fruticultura de Exportación. Oficina de Estudios y Políticas Agrarias del Ministerio De Agricultura de Chile.

Pimentel, D., Hepperly, P., Hanson, J., Douds, D., and R. Seidel, 2005. Environmental, Energetic and Economic Comparisons of Organic and Conventional Farming Systems. BioScience 55(7): 573-582.

Poulton, C., Dorward, A. and J. Kydd, 2010. The Future of Small Farms: New Directions for Services, Institutions, and Intermediation. World Development 38(10): 1413-1428.

Raynolds, L.T., 2004. The Globalization of Organic Agro-Food Networks. World Development 32(5): 725-743.

Rodríguez, J. and W. Kern, 2009. Análisis Técnico Económico Comparativo de la Producción Orgánica, Biodinámica y Convencional de Manzanas (Malus pumilla I.). Congreso de Economistas Agrarios, Viña del Mar, Chile.

Rowan, C., 2000. Sourcing organic and non-GM ingredients. Food Engineering International 25(2): 28–31.

Seufert, V., Ramankutty, N. and J.A. Foley, 2012. Comparing the yields of organic and conventional agriculture. Nature 485: 229-234.

Soto, S. and M. Otero, 2013. Catastro Laboral Agrícola 2012. Oficina de Estudios y Políticas Agrarias del Ministerio de Agricultura de Chile.

Sorby, K., 2002.What Is Sustainable Coffee? Background paper to the World Bank Agricultural Technology Note 30.Washington (DC): World Bank.

Stelder, D., 2012. Spatial monopoly of multi-establishment firms: An empirical study for supermarkets in the Netherlands. Papers in Regional Science 91(1): 181-192.

Wood, S., Lowea, M. and N, Wrigley, 2006. Life after PPG6-recent UK food retailer responses to planning regulation tightening. International Review of Retail, Distribution and Consumer Research 16(1): 23-41.

Yussefi, M. and H. Willer, 2003. The world of organic agriculture. Tholey-Theley, Germany: IFOAM.

Appendix A

Information Related To the Agricultural Goods Considered In the Investigation

Blueberry

Currently the production of blueberry in Chile covers about 13,000 ha and is concentrated between the III and XIV regions (Luengo, 2010). For the period 2012/2013, Chile exported approximately 84,900 tons implying a 21% increase with respect to the previous period. Within this total, organic blueberry has increased its share to 10% in relation to exports of fresh blueberries being the United States the main importer. The area certified as organic in Chile corresponds to about 1,990 ha (ODEPA, 2013).

According to the Agricultural Census of 2007, 22.43% of the labour used in the production of blueberries involves full time workers, a fact that is explained by the existence of qualified staff such as tractor drivers, experts in irrigation, and quadrille managers who form part of full time permanent workers. The remaining 77.57% corresponds to seasonal part time staff employed during the November-January term.

The production of organic blueberries is concentrated in the Bío-Bío Region of Chile covering a regional area of 823 ha. The Metropolitan Region is also an important productive focus.

Kiwi

The production of Kiwi involves 3.95% of the national planted areas. According to the 2007 Agricultural Census, there are 9,957.37 ha covered by Kiwi at the national level. They are split as follows: 3,072.74 ha are in formation; 1,681.31 ha correspond to planted areas; and 6,884.63 ha are in production. The Maule region contains 50% of the total area. The production of organic Kiwi, on the other hand, covers a certified national area of 413 ha (ODEPA, 2013).

The information provided by the 2007 Agricultural Census indicates that the percentage of permanent labour employed in tasks related to the production of kiwi corresponds to 22.73%. The remaining 77.27% corresponds to part-time seasonal staffs who work in the November-January and February-April terms.

Raspberry

Currently, the area covered by raspberry in Chile is 13,000 ha and is concentrated in the VII and VIII regions of this country. The exports in the 2012/2013 period were 38,000 tonnes approximately. Organic raspberry is the main organic berry produced in Chile and covers an area of 823 ha which is concentrated in the Bío-Bío Region of Chile (ODEPA, 2013).

Asparagus

Asparagus is a horticultural good that covers an area of 2,500 ha in Chile and is concentrated in the VII region of this country. The production is traded mainly in the domestic market. In the 1990s, the production of asparagus covered an area of 10,000 ha and was exported to international markets. However, the entry of Peru as world supplier with competitive costs caused a significant contraction of the production in Chile. Currently it is estimated a certified area of organic asparagus of 30 ha at the national level (ODEPA, 2013).