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Impact of business transfer on economic performance: the case of Italian family farms

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Abstract: The impact of business transfer on family business performance is widely explored in the literature but is neglected for agriculture although family farms are key players in the economy. We investigate whether the succession changes the economic performance of family firms for Italian family farms during the period 2008–2014. Our results show that succession on these family businesses has a negative effect on their economic performance related to capital, due to an increase in capital after succession. One policy implication is that support for investment by new farmers should be improved.

Keywords: family business; succession; economic performance; propensity score matching; PSM; Italian farms.

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1 Introduction

A remarkable number of firms, especially among small businesses, are managed by the holder family (Chang et al., 2008; Daily and Dollinger, 1992). This is one way of defining family businesses [see for example the review by Brockhaus (2004)]. As a consequence of such family-based structures, intra-family succession is an important modality to ensure continuity of the business (Lucky et al., 2011), as well as a possible exit strategy for the current entrepreneur (Morris et al., 2018). For this reason, succession is a widely explored topic in family business research (Benavides-Velasco et al., 2013; Le Breton-Miller et al., 2004; Wennberg et al., 2011), but to a lesser extent for small family business (Muskat and Zehrer, 2017). Because it is a delicate step in the transition of a family business, a limited share of firms remain viable and survive into the following generations (Miller et al., 2003; Molly et al., 2010). A possible cause of such low firm survival may arise from the nexus among succession, its modality (intra- or extra-family) and future performance of the business (Cucculelli and Micucci, 2008; De Massis et al., 2008; Wennberg et al., 2011). There are three main ways in which a family business may be passed on:

1 transferring ownership to outsiders

2 transferring management to outsiders while maintaining family ownership

3 intra-family transferring both ownership and management.

The role of the type of family business transfer on the business' survival is scarce, but the role on (short-term) performance has recently been examined empirically, with inconclusive results throughout the existing literature.

In this context, our article aims to contribute empirically to the issue of impact of family business transfers on economic performance, in a sector where it has been little investigated yet, agriculture (Bertoni and Cavicchioli, 2016a). This sector is however very peculiar, as the family often lives on the business place (the farm), and the main factor of production (land) is not only that but also a family asset. These specificities explain why most family businesses remain in the same family over many generations: farming families try to align family strategic planning to business planning so as to keep the business in the family. This may imply sub-optimal decisions and may impact the business performance, as least in the short term. We thus investigate the impact of transfer on business economic performance in agriculture, taking the case of Italian family farms over the period 2008–2014. The rest of the paper is structured as follows. The section *literature review* presents relevant existing studies. *Data and methodology* describes the background of the illustrative case, the data used and the empirical methodology. This is followed by *results* and *discussion*. The section *conclusion* ends the paper.

2 Literature review

2.1 Business transfer and performance

Business transfer is a strategic stage in the life-cycle of firms. It can bring a new breath to the firm but is a risky event that may put the business survival at stake. Understanding how performance develops after succession is therefore of key importance. The impact of business transfer on performance has been studied in the literature. For example, Diwisch et al. (2009) analysed the effect of succession on the growth of firms in Austria and found a significant positive effect on employment growth. Several studies investigated the effect of a change in CEO on firms' performance and reported mixed findings (see the review in Karaevli, 2007). Other studies have dealt with the link between succession and firm performance, by comparing performance of firms for which management was kept by family heirs (intra-family succession) with firms with management transferred to managers outside the family (extra-family succession). In this literature, some authors reported lower performance (for example in terms of profitability and value) of firms with intra-family compared to extra-family succession (Bennedsen et al., 2007; Cucculelli and Micucci, 2008; Perez-Gonzalez, 2006; Villalonga and Amit, 2006; Wennberg et al., 2011; Chung and Luo, 2013). One reason may be that non-family managers bring relevant skills and new ideas (Chua et al., 2003). However, Molly et al. (2010) did not find any significant difference in profitability between firms with and without intra-family succession, suggesting that such an event does not necessarily imply a negative outcome in the family business cycle. Finally, Baek and Cho (2017) found that second-generation management within a family firm increased employment and payroll compared to founder management, but that this positive effect over the whole sample became negative when only large firms were considered.

Behind these ambiguous findings, various parameters may be at play. The transfer phase may be seen as an opportunity for innovation in businesses or a 'catalyst of

change' (Griffeth et al., 2006; Hauck and Prügl, 2015). Successors may indeed be more educated, more dynamic, and willing to bring their own stone to the construction especially when they take over from a senior (Ibrahim et al., 2004; Hauck and Prügl, 2015). This may have favourable consequence on the performance of the business. However, the theory suggests that new entrants are characterised by faster growth than established firms (Hart, 2000). The idea is that new entrants indeed focus on developing their business in the first years (the creation or growth stage of the life cycle), in order to achieve minimum long-run average cost. The resulting indebtedness and adjustment costs of developing their business incurred by new entrants may negatively impact their performance in the first years following these changes.

Additional parameters are at play in the case of family business' transfers. One specificity of family business is that ownership and management are concentrated in the same hands. This may have advantages in terms of decreased agency costs (Cucculelli and Micucci, 2008; Mazur and Wu, 2016), but may also put the business at risk at the stage of succession since both ownership and management must be transferred. An advantage of family businesses is linked to the positive contribution of social exchanges to successful transfer through early-stage successor development (Daspit et al., 2016). Indeed, in family businesses, heirs – usually children – are close to current managers over a long period and so are more likely to receive the necessary experience, social capital, namely values, professional knowledge, as well as 'familiness' and intangible resources such as tacit knowledge (Cabrera-Suárez et al., 2001; Sund et al., 2015; Vassiliadis and Vassiliadis, 2014; Yezza and Chabaud, 2020). This may favourably impact the business performance after transfer, in particular when the predecessor is a woman, as women may have better communication and relationship skills, and mothers may better know their children than fathers (Cadieux et al., 2002). However, family history and ties, as well as family agency problems increased by the management involvement of family members who belong to different generations, make the process more complex in psychological and sociological terms, and may have negative consequences on the business performance (Basco, 2013). These constitute Lansberg's (1988) three-circle model of ownership, management, and family systems, and relate to the issue of ethics explained by Brockhaus (2004) that family successor must often choose between a decision that is best for the family and a decision that is best for the business. Some decisions may therefore put the performance of the business at risk after transfer, as they may be led by emotional and biological imperatives rather than rational goals (Basco and Perez Rodríguez, 2011). As underlined by Kamei and Dana (2012) for a Japan case study, these human risks may be as important as financial risks.

2.2 The specific case of farm businesses

Most farms worldwide are family businesses. Using FAO (2014) data, Graeub et al. (2016) estimated that there are 500 million family farms in the world, representing 98% of total farms and managing 53% of farmland, while Lowder et al. (2016) estimated these values at 90% and 75%, respectively. Such concentrations are not homogeneous across continents. For instance, the share of family farms ranges from 78% in Oceania to 99% in Asia, while the proportion of farmland managed by such farms is lowest in South America (18%) with a peak of 85% in Asia (Graeub et al., 2016). Although there is no universal definition of a family farm, as for family businesses in general, and it depends on the local context, this business model is undoubtedly the most frequently-found in the

agricultural sector. The above-mentioned challenges faced by family businesses upon transfer therefore apply to farms.

In addition, compared to other businesses, farms have the particular characteristic of using land for their activity. This is not trivial because land is often owned, and therefore is not only considered as a production factor but also as a family asset that should be kept in the family in the long term. In addition, the family house is often on the farm, and a family successor can ensure that the retiring farmer can still live there. All this may give even more incentive to this type of family business to continue farming over the next generation and hence to achieve a successful transfer. Another specificity of farms, at least farms in most industrial countries, is that they are heavily subsidised. In the European Union's (EU) farmers receive various payments under the Common Agricultural Policy (CAP). One type of payments that may influence the success of farm transfer is the delivery of subsidies to farmers aged below 40 who are settling down. Such subsidies may facilitate the adjustment process in the first years and hence limit the decrease in farm performance (Nordin and Loven, 2020).

The role of transfer on performance has been relatively neglected in the agricultural literature, which has largely examined the topic of farm business transfer from other perspectives (Bertoni and Cavicchioli, 2016a; Corsi, 2018). From the descriptive viewpoint, some authors quantified farm succession rates and the demographic distribution of farmers (Errington, 1998; Lobley et al., 2010; Zagata and Sutherland, 2015). Qualitative analyses have examined pathways of succession, retirement, and transfer of both physical assets and specific knowledge in family farms (Fischer and Burton, 2014; Gaté and Latruffe, 2015; Uchiyama et al., 2008). In parallel, a rich strand of literature has used quantitative tools to estimate

1 the probability of succession (Cavicchioli et al., 2019, 2015; Glauben et al., 2009; Kimhi and Nachlieli, 2001; Mishra and El-Osta, 2008)

2 succession timing (Glauben et al., 2004; Kimhi, 1994)

3 the motivations behind succession (Mishra and El-Osta, 2016)

4 the relationship between succession and farm assets/performance.

On the latter point, several studies found a direct relationship between succession probability on the one hand, and farm economic performance or investment before succession on the other hand (Bertoni and Cavicchioli, 2016b; Cavicchioli et al., 2015; Corsi, 2009; Glauben et al., 2009; Kerbler, 2008; Mishra and El-Osta, 2008). Two studies, Carillo et al. (2013) and Laband and Lentz (1983), compared the business performance between two modalities of farm succession. Carillo et al. (2013) evaluated the difference in economic performance between inherited and non-inherited farms using cross-sectional data from a sample of 11,000 Italian farms. They showed that inherited farms tend to under-perform with respect to non-inherited farms. Laband and Lentz (1983) found the opposite result, with inherited farms over-performing compared to those not inherited. However, no studies in agriculture have specifically investigated how performance changes after succession. Our article contributes to this literature gap with the first empirical study in agriculture.

Based on the literature on farmers' attitudes and behaviour, we expect no clear-cut impact of farm transfer on performance, as for the case of the other businesses reviewed in Subsection 2.1. For example, Zhengfei and Oude Lansink (2006) suggested that there

is an adjustment period of newly settled farmers, where they get into debt and invest to expand, maybe impacting negatively farm performance. The presence of a successor on the farm before succession takes place may influence future farm strategies in a positive way and limit this decrease in performance, since younger farmers are generally more oriented toward diversifying farm activities and adopting more sustainable agricultural practices (Sottomayor et al., 2011; Stiglbauer and Weiss, 2000; Suess-Reyes and Fuetsch, 2016; Zagata and Sutherland, 2015). In addition, some actions taken by the retiring farmer before transfer, and aiming at developing the farm and improving performance, can also make the farm more attractive to successors (Cavicchioli et al., 2015; Lobley and Baker, 2012) and ensure its viability (Wheeler et al., 2012). For example, the level of farm assets and farm investment may be influenced by an upcoming transfer process, as the soon-to-retire farmer may implement some investment to prepare for his/her successor. Kimhi et al. (1995) called this the 'shadow of succession' [quoted by Diwisch et al. (2009)]. For example, Gaté and Latruffe (2015) reported, for their sample of soon-to-retire farmers in the Brittany region of Western France, that many of these farmers invested in their farm before their retirement, to develop it with a view to improving its performance after succession had taken place. Other researchers (Calus et al., 2008; Mishra and El-Osta, 2008; Potter and Lobley, 1996) argued that farm investment increases when a farm successor is identified. However, the causality nexus between investment and the presence of a successor is not clear-cut and should be taken into account in analyses, such as in Wright and Brown (2018): on the one hand, the increase in farm investment may occur in preparation for the incoming succession (the designated successor may be involved in farm management before the official farm transfer); and, on the other hand, succession may be more likely to occur on thriving farms with a higher level of investment.

3 Data and methodology

3.1 Overview of the case study

Italy's economy is characterised by a considerable number of small-size businesses. In 1990 it was reported that 99% of the Italian businesses were small and medium sized enterprises with less than 50 employees (Dana, 2018). This situation has started in the '70s as a survival strategy against the oil and economic shocks. Despite the lack of 'supportive entrepreneurial ecosystem', this entrepreneurial fragmentation has continued over the decades thanks to the intense cooperation between businesses, social capital, as well as strong family bonds present in most of the businesses (Dana, 2018).

The small size characteristic of Italian businesses applies to the agricultural sector. According to Eurostat, there were about 1 million farms in Italy in 2013, representing 9.3% of EU-28 farms. The average physical dimension of Italian farms was about 25% lower than the EU average, with only 12 hectares (ha) of utilised agricultural area (UAA) per farm. The same holds true for the average labour dimension, with 0.8 annual working unit (AWU) (that is, full time equivalent worker) per farm in Italy. However, the standard output[1] per farm was 41% above the EU-28 average, and standard output per AWU was 54% above the average. Nevertheless, Italian farming sector productivity is not comparable with other economic sectors in Italy. The agricultural value added per worker is 33.5% lower than that of the industrial sector and 38% lower than in trade and services.

A large proportion of Italian farms are operated as family farms, where the farmer's household is directly engaged in the farm business management. In fact, in 2013 a high share of 77.4% of farm labour came from farm household members (Eurostat). However, the share of farms where the farmer's children worked on the farm was only 17.3% in 2010 (Italian Agricultural Census 2010). The ratio of the number of children aged 20–40 working on the farm to the number of farm holders, was only 15.8%. For each child aged 20–40 working on the farm, there were 2.2 children not working on the farm.

Another characteristic of the Italian farming sector is that farmers are not young: in 2013 about 40% of Italian farms were managed by a farmer aged 65 or older (Eurostat). Such a share is considerably higher than the EU-28 average of 31%. Only 4.5% (6% in the EU-28) of farmers were aged less than 35. Given an average UAA per farm of only 65.5% of the national average, Italian farms managed by the eldest farmers are generally smaller than other farms. Similarly, their standard output per farm amounts to only 55% of the national average. The picture regarding farmers' education in Italy is not glossy: in 2010 (Italian Agricultural Census 2010) less than 30% of Italian farmers had at least a secondary school diploma, while only 6% had a degree. In farms managed by a farmer of 65 years or older, these figures fall to 11.5 and 3.6%, respectively. Hence, when farms are transferred to the next generation, there is an opportunity to improve farm performance by bringing in 'fresh blood' from younger and more educated farmers.

3.2 Data and proxy for farm succession

Our analysis uses data from the national farm accountancy data network (FADN) Italian database over the period 2008–2014. This is an annual accountancy database for commercial farms that are representative of regional production and that have a minimum economic size. The database is an unbalanced panel sample, with the farm rotating rate within the database being about 16%. Family farms were selected on the basis of the FADN variable defining the management type, and consisted of those managed by family members, with three possible types: farms with family members only; farms with a prevalence of family members; and farms with a prevalence of hired workers. Among these three categories, we selected only farms having a sole farm holder, as it was possible to build a proxy of succession (explained in detail below). In addition, we removed farms with aberrant data, namely zero labour, zero or negative capital, or negative value of total output. We kept only those family farms that we could observe each year during 2008–2014, in order to obtain a balanced sample and better follow the evolution of performance before and after succession.

A farm succession event is not recorded in the FADN database. Therefore we used a proxy to capture the event of succession: we identified an event of succession based on managers' age differences between two consecutive years. The change in manager's age is widely used to identify a succession event both in non-agricultural firms (Bach, 2010; Bach and Serrano-Velarde, 2015; Bates et al., 2000; Colombo et al., 2014) and in the farm sector (Kimhi and Bollman, 1999; Remble et al., 2010; Stiglbauer and Weiss, 2000). Furthermore, documents based on official statistics (Allen and Harris, 2005), as well as expert opinions and direct interviews with farmers in Italy collected by us, support the reliability of age difference to approximate a succession event.

We consider that farms with no succession are those for which the age of the manager increases by one year every year during 2008–2014. By contrast, we assume that there has been a succession event on a farm between year t and year $t + 1$ if the age of the

manager in $t + 1$ is at least 20 years lower than the age of the manager in t (that is, age difference ≥ 20 years). This suggests that there has been a manager renewal, with the new manager being 20 (or more) years younger than the previous one. In this case, the succession date, which we denote T, is assumed to be in year $t + 1$, that is to say in the first year when the new manager operates the farm. Farms for which the change in the manager's age is strictly smaller than 20 years (implying that entrants were not young, a rare situation in Italy) and farms for which the age has increased between t and $t + 1$ (new entrants older than exiting farmers, probably a situation where a widow becomes manager), are not considered as farms with succession here. These two categories represent only 1 and 0.6%, respectively, of the final balanced sample used.

Table 1 shows the final balanced sample used in this study: 3,114 farms including 2,982 where no succession occurs during the period ('farms without succession') and 132 farms (4.2% of the sample) where one (and only one) succession occurs during the period ('farms with succession'). As the period of observation starts in 2008, the first year in which successions are observed is 2009. Most successions take place in 2011 (29.5%) and in 2013 (25%).

Table 1 Number of farms in the sample used, observed each year during 2008–2014

	Number of farms	*Share of farms*
All farms, including	3,114	100%
Farms without succession	2,982	95.8%
Farms with succession	132	4.2%
Farms with succession, including	132	100%
Farms for which succession occurred in 2009	10	7.6
Farms for which succession occurred in 2010	21	15.9
Farms for which succession occurred in 2011	39	29.5
Farms for which succession occurred in 2012	15	11.4
Farms for which succession occurred in 2013	33	25.0
Farms for which succession occurred in 2014	14	10.6

Source: The authors based on Italian FADN data

3.3 Comparing farm performance before and after succession

As stated by Chua et al. (2018) "performance can be measured in terms of organizational efficiency, the relationship between outputs and inputs, or in terms of organizational effectiveness, the relationship between outputs and goals." Here we consider the former concept, and more precisely how outputs and inputs generate economic performance. In this way, three main aspects of economic performance are generally considered for firms: productivity, profitability and growth (e.g., Addison and Hirsch, 1989; Bottazzi et al., 2008). Here we focus on profitability, which is recognised to be low in agriculture compared to other sectors and may constrain the continuity of farming (Meert et al., 2005; European Commission, 2010; Bertoni and Cavicchioli, 2016b). In the following, profitability is compared across farms with one proxy for revenue (total revenue), two proxies for costs (total costs and production costs), and two proxies for profit (value added and net income). This can help show which part of the profit (revenue or costs) is affected after succession. More precisely, the five following proxies are used:

- Total revenue: Includes the value of total farm output, subsidies and other revenues.
- Production costs: Includes intermediate consumption and other direct costs such as processing or selling costs.
- Total costs: Includes all costs incurred by the farm (except taxes), namely production costs, capital depreciation, and costs for total external factors such as wages of hired labour, land rentals, interest, and other expenses.
- Value added: Calculated as total revenue minus production costs.
- Net income: Calculated as value added minus wages of hired labour, land rentals, capital depreciation, interest, and other expenses.

The sample includes farms with various production specialisations (field crops, dairy, fruits, and vegetables), and hence of differing size. Averaging performance proxies over the sample is thus not suitable. We therefore control for size effects by relating the performance proxies to size variables. Since the sample farms have various production specialisations, there is no uniform size measure. For this reason, the five performance proxies are related in turn to UAA, labour, and capital. Thus, 15 performance indicators are used: five indicators per ha, five per AWU, and five per unit of capital.

We aim to assess whether performance changed on a farm following succession. For robustness of comparison, we use two complementary methodological approaches (A) and (B).

- Methodological approach (A): First, we compare, for the sub-sample of farms where succession has occurred, their average performance in the period before succession and in the period after succession, using *t*-tests of equality of means for the 15 performance indicators. For example, knowing that we observe data for 2008–2014: if succession is in 2009, then the period before succession is 2008, and the period after succession is 2009–2014. If succession is in 2011, then the period before is 2008–2010, and the period after is 2011–2014.
- Methodological approach (B): Second, we use propensity score matching (PSM), which can help estimating causal treatment, that is, the effect of a treatment of an agent on an outcome. The technique is popular in medical research, in which medical programs are evaluated in experiments with a group of treated and a group of untreated patients. However, it has also been widely used in a variety of fields to study the effect of a decision by an agent or of a policy measure on a specific outcome such as profitability, wage, or economic development of rural areas (Caliendo and Kopeinig, 2008; Pocol et al., 2017). In agriculture it has, for example, been used to study the effect of the decision to implement direct selling on Italian farms' profitability (Caracciolo et al., 2015), the effect of the decision to adopt organic technology on technical efficiency of farms in the USA (Mayen et al., 2010), or the effect of agri-environment policy programs on German farms' input use and output (Pufahl and Weiss, 2009). In the literature on succession, it has been used by Diwisch et al. (2009) to study the effect of Austrian family firms' succession on their growth. Along the same lines, we apply PSM to the agricultural context, studying economic performance instead of growth. In the PSM approach, since only the outcome under the treatment scenario is observed, the potential outcome in the no-treatment scenario is built counterfactually. For this, counterfactual outcomes are

constructed with similar agents who however do not participate in the program. The propensity score is the probability of participating in the treatment program given these characteristics. It helps select agents with identical characteristics (except for the treatment) before comparing their outcome. Here several outcomes are studied; namely, the 15 performance indicators listed above. The treatment is succession – therefore we investigate the causal effect of succession on performance.

With PSM we compare performance after succession for a farm where succession occurred (that is during the period from *T* to 2014, where *T* is the date when succession took place and 2014 is the last year of our observations) with the performance of a similar farm which experienced no succession during the period from *T* to 2014. For this, in a first step, farms with succession are matched with farms without succession, that are similar (counterfactual farms), that is, they have identical characteristics. The matching is based on covariates, which are characteristics that do not change with the treatment (the succession). In a second step, the average treatment effect of the treated sub-sample (that is, farms with succession) is computed, showing the difference between the actual performance of farms where succession took place and the expected performance if no succession had taken place. For example, a farm F1 in which succession occurred in 2011 is 'matched' with a farm of similar characteristics to F1 in year 2011, or in year 2012, or in year 2013, or in year 2014, say F2. Then the performance of F1 in 2011 is compared with performance of this 'matched' farm F2 in 2011, and the corresponding performances are compared in 2012, 2013, and 2014. These yearly comparisons are then used to provide an average effect for farm F1, which is an average effect for the period 2011–2014. The period for the average effect differs from one farm to another, depending on the year that succession occurred. For some farms, the period is long (for example a farm with succession in 2009 has the average effect calculated over the period 2009–2014) but for other farms it is short (for example a farm with succession in 2013 has the average effect calculated over 2013–2014 only).

The PSM applied to farms with succession and without succession is supposed to be a more robust approach than simple *t*-tests on farms with succession [which is methodological approach (A)], since there may be selection effects, in the sense that farms with succession may present some specific characteristics and that the probability of succession may not be random. However, we keep the *t*-test methodological approach (A) as a comparison, because PSM results may be affected by the choice of the covariates used to construct the counterfactual situations.

4 Results

4.1 Description of sample farms with/without succession and before/after succession

Table 2 describes the full sample and compares both sub-samples – namely the sub-sample of farms with succession and the sub-sample of farms without succession – during the full period of 2008–2014, thus including the periods before and after succession for farms with succession. Therefore, for all farms, regardless of succession status or timing, Table 2 shows descriptive statistics for the whole observation period of 2008–2014. The full sample farms operate on average 27.1 ha of UAA and use 1.7 AWU

of labour. They rent on average 33.8% of their land and hire 11.3% of their labour force. They mostly specialise in permanent crops, field crops, and grazing livestock (31.2%, 23.4% and 21.9% of the sample, respectively). Half of the farms are located in less favoured areas and 21.9% in mountainous areas. Comparing both sub-samples show that, on average over the whole period, farms on which succession occurred differ from farms without succession: farms with succession are larger in terms of land, labour, capital, and value of output produced (for example 35.4 ha of UAA on average versus 26.7 ha for farms without succession) and resort less to rented land. In addition, the sub-sample of farms with succession have a lower share of farms specialising in field crops and horticulture, but a larger share of those specialising in grazing livestock and mixed cropping, than farms without succession. This sub-sample of farms with succession also has a larger share of farms with a female head, of organic farms, and of farms with other gainful activities (such as processing, selling, tourism, and catering), but a slightly lower share of farms located in mountainous areas, than farms without succession.

Table 2 Descriptive statistics of the full farm sample used and of the two sub-samples of farms without and with succession (2008–2014)

	All farms (full sample)		*Farms without succession*		*Farms with succession*	
Number of farms	3,114		2,982		132	
	Mean in the period 2008–2014	*Min. of the period 2008–2014*	*Max. of the period 2008–2014*	*Mean in the period 2008–2014*	*Mean in the period 2008–2014*	*t-test of equality of means*
UAA (ha)	27.1	0.1	1,731.3	26.7	35.4	–2.7***
Labour (AWU)	1.7	0.05	51.2	1.7	1.8	–2.6***
Capital (ths euros)	625.9	0.51	21,701.2	616.9	773.3	–3.1***
Total output (ths euros)	107.3	0.15	7,189.7	105.6	147.4	–2.2**
Share of rented in land (%)	33.8	0	100	34.4	21.8	11.2***
Share of hired labour (%)	11.3	0	100	11.2	12.5	–1.7*
Age of the farm head (years)	54.6	19	92	54.6	54.2	–0.9

Notes: The second part of the table reports the share of farm-year observations and not the share of farms, as some farms may have changed their category after succession. The last column reports *t*-values and significance for the test with null hypothesis of equality of means, or *z*-values and significance for the test with null hypothesis of equality of shares (proportions). ***, **, * indicate significance at the 1%, 5%, 10% level, respectively. UAA indicates utilised agricultural area and AWU indicates annual working units (i.e., full-time equivalent workers).

Source: The authors based on Italian FADN data

Table 2 Descriptive statistics of the full farm sample used and of the two sub-samples of farms without and with succession (2008–2014)

	Share of farm-year observations in the period	*Share in the period*	*Share in the period*	*Test of equality of proportions*
Farms with female head	17.8	17.6	21.3	–2.9***
Farms with main specialisation				
Field crops	23.4	23.6	17.1	4.6***
Horticulture	8.4	8.6	4.2	4.6***
Permanent crops	31.2	31.1	33.9	–1.8*
Grazing livestock	21.9	21.6	29.2	–5.5***
Granivores	3.1	3.1	3.1	–0.02
Mixed cropping	6.3	6.2	8.2	–2.5**
Mixed livestock	0.7	0.7	1.0	–0.8
Mixed crops-livestock	5.0	5.1	3.3	2.5**
Organic farms	3.19	3.1	4.3	–2.0**
Farms with other gainful activities	27.4	27.0	35.6	–5.8***
Farms in less favoured areas	50.3	50.4	48.2	1.3
Farms in mountainous areas	21.9	22.1	18.9	2.2**
Farms in regions				
North-West Italy	35.7	36.1	26.5	6.0***
North-East Italy	25.0	24.7	33.4	–6.0***
Central Italy	11.3	11.5	6.8	4.4***
Southern Italy	22.7	22.5	26.5	–2.8***
Islands	5.3	5.2	6.8	–2.2**

Notes: The second part of the table reports the share of farm-year observations and not the share of farms, as some farms may have changed their category after succession. The last column reports *t*-values and significance for the test with null hypothesis of equality of means, or *z*-values and significance for the test with null hypothesis of equality of shares (proportions). ***, **, * indicate significance at the 1%, 5%, 10% level, respectively. UAA indicates utilised agricultural area and AWU indicates annual working units (i.e., full-time equivalent workers).

Source: The authors based on Italian FADN data

Before investigating whether economic performance changes for farms following succession, we study whether their structure has changed. We focus here on the sub-sample of farms where succession occurred (132 farms). We compare their characteristics during the period before succession (for example 2008–2010 for a farm with succession in 2011) and their characteristics after succession (2011–2014 for the previous example).

Table 3 Comparison of characteristics before and after succession for the sub-sample of farms which had succession

	Before succession: 132 farms	*After succession: 132 farms*	
	Mean in the period before succession (from 2008 to T – 1)	*Mean in the period after succession (from T to 2014)*	*t-test of equality of means*
UAA (ha)	35.7	34.9	0.3
Labour (AWU)	1.8	1.8	1.0
Capital (ths euros)	671.8	861.4	–2.9***
Total output (ths euros)	139.5	146.1	1.2
Share of rented in land (%)	19.6	22.9	3.2***
Share of hired labour (%)	13.3	11.6	1.6
Age of the farm head (years)	69.8	22.9	39.3***
CAP investment subsidies for farm modernisation			
Per UAA (ths euros/ha)	11.4	83.6	–2.0**
Per labour (ths euros/AWU)	58.4	1,149.2	–2.3**
Per capital	0.00002	0.003	–2.5**
CAP investment subsidies for young farmer setting up			
Per UAA (ths euros/ha)	8.2	108.6	–2.2**
Per labour (ths euros/AWU)	84.6	956.0	–2.6**
Per capital	0.0008	0.003	–2.1**

Notes: The year of succession is denoted *T*. The last column reports *t*-values and significance for the test with null hypothesis of equality of means, or *z*-values and significance for the test with null hypothesis of equality of shares (proportions). ***, **, * indicate significance at the 1%, 5%, 10% level, respectively. UAA indicates utilised agricultural area and AWU indicates annual working units (i.e., full-time equivalent workers).

Source: The authors based on Italian FADN data

Table 3 Comparison of characteristics before and after succession for the sub-sample of farms which had succession (continued)

	Share of farms in the year before succession (T – 1)	*Share of farms in the year of succession (T)*	*Test of equality of proportions*
Farms with female head	15.9	23.5	–1.5
Farms with main specialisation			
Field crops	15.9	15.1	0.2
Horticulture	4.5	4.5	0.0
Permanent crops	33.3	31.8	0.3
Grazing livestock	29.5	32.6	–0.5
Granivores	3.0	3.0	0.0
Mixed cropping	9.0	11.4	–0.6
Mixed livestock	0.8	0.8	0.0
Mixed crops-livestock	3.8	7.6	1.6*
Organic farms	3.8	3.8	0.0
Farms with other gainful activities	34.0	41.7	–1.3

Notes: The year of succession is denoted *T*. The last column reports *t*-values and significance for the test with null hypothesis of equality of means, or *z*-values and significance for the test with null hypothesis of equality of shares (proportions). ***, **, * indicate significance at the 1%, 5%, 10% level, respectively. UAA indicates utilised agricultural area and AWU indicates annual working units (i.e., full-time equivalent workers).

Source: The authors based on Italian FADN data

Table 3 shows that, although size in terms of land, labour and output does not change in the period following succession compared to the period before succession, the farms' capital value greatly increases on average from 671,800 to 861,400 euros. This suggests that farmers taking over a farm implement investment, which may be aimed at extending the current activity, modernising equipment, complying with standards, or developing a new activity. This is confirmed by the subsidies received by farms under the rural development program of the CAP: following succession, farms receive much larger subsidies for investment aimed at farm modernisation or supporting young farmers setting up, than in the period before succession. The share of land rented also increases on average (from 19.6 to 22.9%) after succession compared to before succession, suggesting an increase in land size in parallel to an increase in capital. This confirms our expectation that family farms invest substantially upon succession. As expected and conforming with the way we identified farms where succession occurred, the age of the farm head decreases after succession, from 69.8 to 22.9 years. A large number of women took over the farms, as the share of farms with female heads in the year before succession occurred (that is, $T - 1$) is 15.9% while the share in the next year (that is, when succession occurred, namely in year T) is 23.5%. Finally, there is no highly significant change in terms of the main production specialisation, type of production (organic or conventional), or implementation of other gainful activities between the periods before and after succession.

4.2 Comparison of performance with the two methodological approaches

We first focus on the sub-sample of farms with a succession and investigate whether performance changes after the succession, namely our methodological approach (A). We report the results from *t*-tests of equality of means comparing their economic performance before and after succession. Table 4 shows the *t*-test results for the 15 performance proxies related to land, labour, and capital. Results indicate that, after succession, total revenue per ha increases on average (from 6,141.6 to 7,081.5 euros) but so do total costs (from 3,059.9 to 3,505.1 euros) and production costs. The increase of both components (revenue per ha and cost per ha) could explain why the profit indicators (value added per ha and net income per ha) do not change significantly after succession. When considering the performance proxies related per labour, there is no significant change after compared to before succession. As for performance related to capital, all indicators decrease significantly after succession, confirming that capital size increases following succession.

Table 4 Comparison of performance before and after succession for the sub-sample of farms which had succession: results from *t*-tests of equality of means

	Before succession: 132 farms	*After succession: 132 farms*	
	Mean in the period before succession (from 2008 to T – 1)	*Mean in the period before succession (from T to 2014)*	*t-test of equality of means*
Total revenue per UAA (euros/ha)	6,141.6	7,081.5	–1.7*
Per labour (euros/AWU)	51,544.9	56,174.2	–1.5
Per capital	0.201	0.154	3.1***
Total costs per UAA (euros/ha)	3,059.9	3,505.1	–2.0**
Per labour (euros/AWU)	29,178.4	31,353.1	–1.1
Per capital	0.116	0.088	2.5***
Production costs per UAA (euros/ha)	1,995.4	2,467.0	–3.1***
Per labour (euros/AWU)	20,847.0	23,401	–1.6
Per capital	0.075	0.062	2.1**
Value added per UAA (euros/ha)	4,146.1	4,614.5	–1.0
Per labour (euros/AWU)	30,697.8	32,773.3	–1.0
Per capital	0.126	0.092	3.2***
Net income per UAA (euros/ha)	3,081,7	3,576.5	–1.3
Per labour (euros/AWU)	22,366.5	24,821.1	–1.2
Per capital	0.085	0.066	3.0***

Notes: The year of succession is denoted *T*. The last column reports *t*-values and significance for the test with null hypothesis of equality of means. ***, **, * indicate significance at the 1%, 5%, 10% level, respectively. UAA indicates utilised agricultural area and AWU indicates annual working units (i.e., full-time equivalent workers).

Source: The authors based on Italian FADN data

Table 5 Comparison of selection variables used in the PSM between farms with succession and control group of matched farms without succession

	Matched farms with succession	*Matched farms without succession*	
Number of farms	426	446	
	Mean in the period	*Mean in the period*	*t-test of equality of means*
UAA (ha)	35.38	34.46	0.18
Labour (AWU)	1.86	1.86	0.02
Share of hired labour (%)	9.16	10.47	–1.01
			Test of equality of proportions
Farms with main specialisation			
Field crops	17.84	17.04	0.31
Horticulture	2.82	4.04	–0.99
Permanent crops	36.15	34.75	0.43
Grazing livestock	31.22	30.27	0.30
Granivores	1.41	1.79	–0.45
Mixed cropping	7.98	8.74	–0.41
Mixed livestock	1.17	1.12	0.07
Mixed crops-livestock	1.41	2.24	–0.92
Farms with other gainful activities	39.44	37.89	0.47
Farms in regions			
North-West Italy	37.09	29.82	2.28**
North-East Italy	33.33	34.30	–0.30
Central Italy	6.81	5.16	1.03
Southern Italy	18.54	24.66	–2.19**
Islands	4.23	6.05	–1.22

Notes: The last column reports *t*-values and significance for the test with null hypothesis of equality of means, or *z*-values and significance for the test with null hypothesis of equality of shares (proportions). ***, **, * indicate significance at the 1%, 5%, 10% level, respectively.

Source: The authors based on Italian FADN data

Second, performance of farms after succession is compared to what their performance could have been without succession, using counterfactual farms selected through PSM, that is, our methodological approach (B). The first step consists in matching farms where succession has occurred, with counterfactual farms (similar farms but without succession). To select the covariates (the farms' characteristics that do not change with succession) we rely on the comparison of the farms' characteristics before and after succession made in Table 3. This table shows that there are not many significant changes before and after succession. Thus, here we match farms based on the characteristics that do not change significantly: their UAA, their labour use, their share of hired labour, their main specialisation category, whether or not they have other gainful activities, as well as

the region of their location. The year is also added within the covariates so that a farm with succession observed in year *t* (after succession *T*) is matched with a farm without succession which is observed in the same year *t*.

Similarity of treated farms – with a succession event – to their counterfactuals (matched farms without succession) is crucial to obtain a reliable estimation of the average treatment effect. Similarity of the two groups is measured based on the values of covariates used in the matching procedure. Thus, to test for internal validity of our matching procedure, we perform a two-sample *t*-test (or a test of equality of proportions) to assess whether there are significant differences in covariate means for both farms with succession (n = 426) and corresponding farms without succession (n = 446) (Pufahl and Weiss, 2009; Rosenbaum and Rubin, 1985). The two samples are identical based on the control variables used for the matching procedure (Table 5), thus excluding bias in sample selection. A limited exception is their regional distribution that tends to slightly over-represent, in the control group, farms of Southern Italy with respect to those of North-West Italy, but we believe that this does not affect validity of the PSM results.

In a second step, the average treatment effect on the treated farms is calculated. This effect compares actual performance on farms after succession with expected performance if no succession had taken place.

Table 6 Comparison of performance of farms which had succession and farms which had no succession: average treatment effect on the treated obtained from PSM

Total revenue per UAA (euros/ha)	–1,461*
Per labour (euros/AWU)	–8,365**
Per capital	–0.030***
Total costs per UAA (euros/ha)	–946*
Per labour (euros/AWU)	–5,100*
Per capital	–0.020**
Production costs per UAA (euros/ha)	–803*
Per labour (euros/AWU)	–4,387
Per capital	–0.010**
Value added per UAA (euros/ha)	–658
Per labour (euros/AWU)	–3,978**
Per capital	–0.020**
Net income per UAA (euros/ha)	–515
Per labour (euros/AWU)	–3,265
Per capital	–0.010**

Notes: ***, **, * indicate significance at the 1%, 5%, 10% level, respectively. UAA indicates utilised agricultural area and AWU indicates annual working units (i.e., full-time equivalent workers).

Source: The authors based on Italian FADN data

Average treatment effects on the treated farms for all 15 performance indicators are shown in Table 6. In contrast to the above findings with *t*-tests [methodological approach (A)], total revenue and costs (in terms of total costs and production costs) reported per ha are lower on farms after succession than on similar farms without succession (Table 6). However, similarly to the above *t*-tests findings, there is no significant difference in profit

indicators (value added and net income) per ha. The indicators per labour unit, in contrast to the *t*-test findings, show some significant differences with PSM: revenue, total costs, and value added per AWU are significantly lower on farms after succession compared to without succession. Finally, *t*-tests results are confirmed in terms of economic performance per capital unit: all performance proxies related per capital are significantly lower on farms after succession than without succession, confirming our expectation.

5 Discussion

This article analysed the effect of family business transfer on the business economic performance (profitability), in the specific case of agriculture, for a sample of Italian family farms in the Italian FADN database over the period 2008–2014. Economic performance was measured in terms of revenue, costs, and profit (value added and income) indicators related to size, in terms of land (performance per ha of UAA), of labour (performance per AWU), and of capital (performance per Euro of capital). The analysis was done with two methodological approaches: first, performance was compared before succession and after succession using *t*-tests, for the sub-sample of farms with succession; second, using PSM, performance after succession of farms with succession was compared with performance of counterfactual farms (similar farms without succession).

There are several findings. First, farm capital value increases after succession on farms with a succession event. Second, this translated into lower economic performance (in terms of revenue, cost, or profit) per capital unit after succession. These two findings were obtained with both methodological approaches. Third, both these approaches show that the results differ depending on which size variable the economic performance indicators are related to: for example, there may be a significant negative effect of succession on performance measured per ha of land, but no significant effect on performance measured per AWU.

As mentioned above, there is little comparable evidence on the effect of succession on farm economic performance. Laband and Lentz (1983) found that ‘follower’ farmers (those who inherited the family farm) over-performed in terms of earnings compared to ‘non-followers’ (those who purchased a farm outside their family), due to a higher return on informal on-farm education or knowledge transfer. However, Carillo et al. (2013), using cross-sectional data of Italian farms and a regression of the value added per labour unit (worker) on a set of covariates, among which there was a dummy for succession, found a negative effect of intra-family farm transfer. Although our results are not directly comparable with these two studies because we compare succession (whether intra- or extra-family) with no succession, they are consistent with those of Carillo et al. (2013), since our results point to a negative effect of succession on value added per labour unit when PSM is used. Aside from the agricultural sector, our results could be compared to the literature on the impact of succession on growth and performance of small- and medium-sized family firms. For example, Cucculelli and Micucci (2008) found a negative impact on performance of intra-family firm succession, compared to business management passed to outsiders. Intra-family succession after the first generation has a negative impact on economic performance according to various studies (Kirmanen and Kansikas, 2010; McConaughy and Phillips, 1999; Miller et al., 2011; Villalonga and Amit, 2006). The long-term effect of succession through generations was found to be

nonlinear (U-shaped) by Sciascia et al. (2014). Similarly, Basco et al. (2019) focused on the effect of board composition (share of family and non-family members) on firm performance, finding a U-shaped relationship. Finally, Diwisch et al. (2009) found a significant positive effect of succession on employment growth in Austrian firms, which is comparable to the capital increase after succession observed in our sample of Italian family farms.

This analysis is one of the rare contributions to the issue of evolution of economic performance after family business transfers in agriculture. Such work could inform policy-makers about whether economic performance drops after succession and whether more attention should be paid to the succession phase, whether by targeting retiring farmers a few years before transfer, by focusing on settling farmers, or by working on the ties and organisation of both groups of farmers. Our findings reveal that it depends which economic performance indicator is considered to be the most important by policy-makers for the farm's survival; for example, whether it is performance per ha or per unit of labour, or performance in terms of revenue or value added. What is clear nevertheless, is that profit indicators (value added and net income) do not increase following succession in the time span that we considered here; at best, they do not change, at worst, they significantly decrease. Such non-positive effect may be due to the changes implemented on the farm while settling down, such as investing in new equipment or a new activity. The life-cycle theory applied to agriculture (Gale, 1994) confirms that new farmers grow fast due to a focus on developing their business in the first years, which is seen in our sample in terms of the capital growth after succession. The resulting indebtedness and adjustment costs of developing their business incurred by new entrants may negatively impact their performance in the first years following these changes (Zhengfei and Oude Lansink, 2006). Another reason for the non-increase of the farm performance in the years following farm transfer, may be that the successor is in fact co-leading the farm with the officially-retired farmer, and not yet in full leadership. The latter corresponds to the fourth (and final) stage identified by Churchill and Hatten (1987) ("a power transfer stage, where responsibilities shift to the successor") within a transfer process between father and son.

Our findings show such a decrease in performance (or at best, stagnation) in the case of Italian family farms. However, due to data limits, our investigation covers only seven years (2008–2014), with short periods of post-succession observation for farms that experienced succession in the last years of the period (2013 and 2014). Indeed, the later such an event takes place, the shorter is the observable time after the 'treatment' (that is the succession event), causing a potential underestimation of its effect on performance. As a not-negligible share of succession events take place in the last years of the period, this represents a limitation of our analysis. Over a longer time span, performance may increase again, once the new farmer and the workers have adjusted to the changes on the farm. Similar results were, for example, found by Wennberg et al. (2011) depending on the time period, with intra-family firm transfer under-performing extra-family firm transfer in the short run, but out-performing in the long run. By contrast, there is agreement that family businesses are focused on achieving long-term rather than short-term performance (Cucculelli and Micucci, 2008; Randolph et al., 2019; Vassiliadis and Vassiliadis, 2014; Wu and Mazur, 2018). Further research with analyses over a longer period is therefore needed. In addition, it would be interesting to investigate the issue per type of farming (for example dairy farms and field crop farms) separately, as the duration of the creation or growth stage may not be the same for different main

specialisations. However, this would require a larger sample of farms with succession and performance data.

The main finding of our study relates to the increase in capital upon succession and the decrease of performance per capital after succession. This indicator is never used in family business literature to assess the link between succession and performance, although we have shown that it is crucial for the agricultural sector. An increase in capital may also be frequent in other sectors of the economy, where succession may represent an opportunity to reorient traditional firm strategies. Such choice may differ across family firms, depending on the degree of education (Chung and Luo, 2008; Zhao et al., 2018) and/or entrepreneurial orientation of the successor (Runyan et al., 2008). A strategic change may be associated with an increase in firm performance, even if some empirical studies show, at least in the short run, an inverse relationship between the former (strategic change) and the latter (firm performance) (Runyan et al., 2008; Zhao et al., 2018). It is worth noting that strategic change is a long-term process, usually associated with new investment (Calus et al., 2008), that may lead to an increase in performance in the long run. For this reason, family firms' owners may accept lower performance in the short run, if this may result in long-term economic performance (Le Breton-Miller and Miller, 2006; Lumpkin et al., 2010). In fact, the literature shows that intra-family successors are more likely to have long-term perspectives compared to outside-family successors (Miller and Le Breton-Miller, 2005) even if the former show lower economic performance in the short run (Wennberg et al., 2011). Our results are consistent with such findings, as we show that succession is associated with increased and/or new investments, resulting in lower performance per capital unit in the first period after succession. Because the farms in our sample experienced mainly intra-family succession, they would predominantly have a long-term perspective, requiring adequate timing for recovery of investments. Unfortunately, given the limited time span of our data, it is not possible to assess the effect of succession on long-term firm performance. A second limitation, and a potential avenue for future research, pertains to the lack of estimates of the effects of different strategic orientation of successors; for instance, the 'entrepreneurial orientation' versus the 'small business orientation' as suggested by Runyan et al. (2008). In any case, further analyses are needed in various sectors to see if our findings can be generalised.

Finally, our article points to a lack of statistical data on farm succession. Succession events are rarely noted in the accountancy data needed to compute performance. In addition, the same farms need to be observed for a long enough period which is costly. Consequently, there is a need to gather them systematically within periodic surveys in agriculture, such as agricultural censuses or farm structure surveys. As farm succession data are not available in official statistics (Zagata and Sutherland, 2015), farm succession quantification has so far relied mainly on ad hoc surveys, such as those carried out under the FARMTRANSFER project (Errington, 1998; Lobley et al., 2010; Uchiyama et al., 2008). As a second-best alternative, farm succession rates (and a shortage of young farmers) have been inferred by the comparison of cohorts of farmers of different ages (see Zagata and Sutherland, 2015). Furthermore, as seen in our article, a farm succession event is not directly recorded in yearly farm-level sample surveys such as the FADN. For this reason, we inferred this from a change in farm holder's age, but this ignores the degree of relationship between the retired farmer and the new entrant, and precludes the investigation of the role of family ties.

6 Conclusions

Family farms are key actors in the economy. The dynamics of family farms have impacts on and implications for food security, the social sustainability of rural areas, and the economic and environmental outcomes of agricultural activity (FAO, 2014). There is a consensus among policy-makers about the desirable role played by family-based agriculture in achieving social, environmental, and economic goals (European Commission, 2017; FAO, 2014), and research has focused on this issue (Suess-Reyes and Fuetsch, 2016; Van der Ploeg, 2013; Van Passel et al., 2007). For example, the social cohesion role played by family farms in rural communities is clearly recognised (Inwood et al., 2013; Renting et al., 2008) as is their contribution to food security, in particular in developing countries (Hazell et al., 2010). Perpetuation and survival of family farms is therefore of interest for society. However, in farming, the availability of successors is diminishing, especially in developed countries. Zagata and Sutherland (2015), referring to the EU context, pointed to a shortage of incoming young farmers that may have two possible consequences:

1 Abandonment of agricultural activities in marginal areas (Burton and Fischer, 2015; Demartini et al., 2015; MacDonald et al., 2000)

2 A diminished propensity of farms for innovation (Calus et al., 2008; European Commission, 2012; McDonald et al., 2014; Vesala and Vesala, 2010), for diversification of activities (McElwee and Bosworth, 2010; Grubbström et al., 2014; Suess-Reyes and Fuetsch, 2016), and for actions leading to environmental sustainability (Bertoni et al., 2011; Hamilton et al., 2015; Van Passel et al., 2007), thus leading to lower performance on those farms where succession has not taken place.

Farm transfer is hence considered a key component of structural change, resilience, and adaptation of the farming sector.

There is no consensus about the way succession may affects farm performance. On the one hand, farm performance may be positively impacted by succession, as there may be an increase in performance due to new impetus given by the entering farmer. On the other hand, farm performance may be, at least in the first years following succession, negatively impacted by succession due to inappropriate decisions if the full leadership has been properly planned, or to any adjustments made by the new farmer on the farm in particular decisions in full leadership and innovation expenditure. A third possibility is no change in performance before and after succession; for example, in the case where the retiring farmer has implemented changes on the farm several years before succession and the new entrant does not apply changes in the farm system when settling down. Our findings point to a decrease of performance in the first years following succession, which may be linked to an increase in capital value. The policy implication is that the CAP support for young farmers' settling down may be insufficient and that support for new entrants' investments should be improved. Implications for research are that more empirical studies are needed on consequences of farm business transfers on performance, to understand the role of the specific context. In addition, it is well known that farmers enjoy non-pecuniary benefits from farming (Howley, 2015), and further research should consider alternative performance indicators to account for non-financial goals as suggested by Chua et al. (2018).

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Notes

1 According to the European Commission Regulation 1242/2008, standard output is the average monetary value at the farm-gate price of each agricultural product in a given region. At the farm level, the standard output of each product is calculated by multiplying the number of hectares of crops or heads of livestock by their specific regional standard output, while the total farm standard output is calculated by summing the standard output of each product.