

Shareholder Value Generation within the Agro-Food Financial Supply Chain

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Abstract

The article aims to define the Czech Agro-Food supply chain and develop financial metrics to quantify the economic value added generated within the supply chain. The study is based on a sample of complete financial statements from 2011 to 2018 from the agro-food organisations. The authors prove that the retail sale sector generates high shareholder value. Contrary to that, the wholesale sector's shareholder value deteriorated over the respective period owing to reinforced capital intensity measures, resulting in low profitability. A special case is primary agricultural production, where the low shareholder value is offset by public transfers influencing all value drivers either directly or non-directly. These constantly changed, both in the single sector and financial supply chain, thus concluding the latter is dynamic in its nature. The primary agricultural production (Agro) faced specific conditions due to significant public transfers in the form of subsidies etc., thus influencing non/directly all shareholders' value drivers and consequently reducing the originally expected vulnerability. The authors have found that the shareholder value is not generated and distributed evenly within the Czech Agro-Food supply chain; therefore, the "scissors" are expanding in favour of the Retail sector at the expense of the others, especially of the Agro sector.

Keywords

Agro-Food sector, Economic Value Added, shareholder value, supply chain.

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Introduction

Shareholder value can be viewed as a financial variable, a method of valuation, but also a concept of management with regard to maximizing the shareholder value, not only in the form of profit shares, but also in the form of profits resulting from the share price growth. The advantage of this concept is the fact that it measures performance considering changes in value, and furthermore that it relates to expected future cash flows, i.e., it is focused on the future - be it the future of the company, the industry, or the entire supply chain. In particular, the Agro-Food chain is specific because it is about food safety for humans, animal welfare and the sustainable use of natural resources. Therefore, the authors focus their interest in this direction.

The paper consists of five parts - the introduction is followed by a literature overview summarizing the relevant literature sources leading

to the definition of three hypotheses. The data set is explained in the third part. The next part presents the results divided into the single sector perspective and the supply chain network perspective. Concluding comments summarise whether or to what extent the hypotheses have been confirmed or refuted.

Literature overview

"The supply chain can be seen as a series of consecutive markets involving input providers and producers, then producers and processors, then processors and wholesalers/traders and finally wholesalers/traders and retailers. Each of these markets is shaped by its own specific supply and demand accounting for price formation. The consecutive markets are interlinked and depend on each other. For a full picture, an understanding of the evolution of prices and value added at all stages of the supply chain would be useful" (Agricultural Markets Task Force 2016).

The value chain structure has been discussed by many scholars in literature, e.g., Blackman and Holland (2006) and Wheelen and Hunger (2002) offering a basis for the construction of the physical value chain structure for industry based rather on cooperative than adversarial strategies among market players. A study by Zhao et al. (2021) examined the impact of agro-food supply chain integration (which consisted of the internal integration of suppliers and customers) on the agro-food product quality and financial performance on a sample of 162 Chinese agro-food enterprises. Their findings show that the product quality fully mediates the relationship between the internal integration and financial performance and the relationship between the supplier integration and financial performance. Four important insights are also provided by Isakson (2014), having evaluated the literature from the political economy point of view. The first one is the finding that the line between finance and food provisioning has been fading away in recent decades, as financial entities are becoming more and more interested in food and agriculture and agro-food firms are increasing participating in financial activities (also supported by Krippner's research 2005). The key finding is the fact that financialization has strengthened the role of food retailers as the key players within the agro-food chain, although they have to mostly follow the dictates of finance capital and compete again with grain traders who can profit from the financial transformation of food very well. The above-mentioned author also asserts that financialization has increased the food workers' exploitation and made their jobs even more insecure. The last finding is the fact that financialization has impacted most on small farmers, for their livelihoods are becoming more and more uncertain and their market power has been weakening compared to the other players in the agro-food supply chain. In connection with these findings, the authors have decided to bring evidence from the Czech Republic, focusing on the shareholder value generation within the Agro-Food financial supply chain.

According to Crotty (2009) or Baud and Durand (2012), since the so-called "shareholder revolution" in the 1990s, corporate managers have redirected their businesses in order to satisfy shareholders' demands which they consider to be the top priority.

According to the shareholder value theory, a company creates value when it meets or exceeds a cost of capital that correctly reflects its investment risk, i.e., business is worth of net present value of its future cash flows discounted at the appropriated

cost of capital (Balakrishnan et al. 2021). Probably the most commonly accepted thought on interlinking company's performance and shareholder value is Economic Value Added (EVA) concept introduced by Stern (1990) and used in a number of studies (e.g., Maia and Di Serio 2017 or Kucera et al. 2021), or the alternatives such as Operating EVA (OEVA) and the Total EVA (TEVA) defined by Ibragimov and Velez-Pareja (2019).

Lambert and Burdugroglu (2000) or Elrod et al. (2013) established link between Economic Value Added and financial supply chain management. Based on the mutual interactions among supply chain participants, they identified four main value drivers influencing companies' Economic Value Added, namely:

- revenues – Beyer and Hinke (2020) highlight the need to compare this variable for enterprises reporting according to the same legislative framework (whether national or e.g., IAS/IFRS) and to use data from accrual accounting.
- operating costs – total or in breakdown e.g., into material, personal, etc. Grau and Reig (2020) report that in the agricultural sector, due to the uneven use of subsidies (recorded in revenues), operating costs are more suitable for inter-company comparisons.
- working capital – as for this aspect, reference can be made to the publication of Oleghe (2019), who designed a model to determine the long-term impact of a company's working capital management within the agribusiness and aquaculture supply chain. Thus, this author claims that there is a systematic approach to working capital management that can be used to prevent financial difficulties or value chain disruption.
- fixed assets or more precisely fixed asset intensity, which is used in research by many authors. Beyer and Hinke (2020) present aggregate results for the Czech agricultural sector, which show a high level of fixed asset intensity compared to nine other European countries.

As stated by Pohlen and Coleman (2005), there is no doubt that supply chain excellence leads to the ability to create shareholder value.

Following the above-mentioned theses, the authors have decided to test the following hypotheses:

H1: Sectors of national economy closer to the final customer tend to produce higher

value added for its shareholders, i.e., the law of diminishing downstream value added decomposition is confirmed.

H2: Value added characteristics remain stable over the observed period of time both on supply chain as well as individual sector's level.

H3: Primary agricultural production as starting production sector (i.e., the most remote from the final customer) is the most vulnerable in its value added generation due its subordinated position within the Czech Agro-Food financial supply chain.

Authors believe that the originality of the proposed text lies in discussed topic itself, since very limited number of papers is covering issue of Agro-Food financial supply chain in general and especially in the context of the Czech Republic is the empirical evidence even more scarce. According to Chakuu et al. (2019) majority of papers focus on industrial sectors, manufacturing, and logistics. Also, majority of studies examine predominantly publicly traded companies (due to accessible financial data) for example study Hall (2018) or Otekunrin et al. (2018), thus omitting significant part of relevant economy (typically SME/family businesses) that are facing different and very often more severe market or financial conditions (Gambelli et al. 2021 or Redlichova et al. 2019). At the same time majority of literature tends to employ working capital measures only, predominantly cash conversion cycle, rather than more complete set of economic indicators (e.g., Deepa et al. 2016) at least in the context of the Czech Agro-Food supply chain (e.g., Jirsak, 2018 or Mokrejšová et al., 2018).

Materials and methods

This study is based on the data sample composed of complete individual financial statements (audited where available) of firms conducting their business in the Czech Republic over period 2011-2018 and belonging to the Czech Agro-Food supply chain. These are data from accrual accounts kept for all firms according to the accounting regulations of the Czech Republic.

To form the Czech Agro-Food supply chain, we follow an approach suggested by Lobisher and Rothbock (2006) linking industrial sectors which typically interact with each other under following assumptions: i) anticipated relationships within predefined supply chain are exclusive (Retail sale sector is exclusively supplied

by Wholesale sector etc.) and ii) potential mutual competitiveness among sectors/other supply chains is neglected, i.e., exclusive manufacturing of goods in each supply chain.

This value chain is defined as individual sectors represented mainly by following NACE (NACE stands for Nomenclature statistique des Activités économiques dans la Communauté Européenne) codes: A1 - Crop and animal production, hunting and related service activities, C10 - Manufacture of food products, C11 - Manufacture of beverages, G46.3 - Wholesale of food, beverages and tobacco and G47.2 - Retail sale of food, beverages and tobacco in specialized stores. In contrast to Lind et al. (2012), no cut off thresholds of turnover were applied. Thus, data sample is incorporating both small and large, as well as publicly traded and private companies. Final balanced dataset contains of 276 firms with complete annual financial figures from period 2011-2018, thus consisting of 2.208 firm - year observations.

Please note that some companies may belong to multiple sectors. For our purposes, we assigned each company to single sector only based on prevailing production. Following aggregation and adjustments were made to achieve consistent and comparable financial figures across all firms in the sample. The accounts receivables and payables are representing only tradable ones (e.g., intragroup accounts receivable are not considered) and are including both due pay and overdue within one year. The inventory counts for raw material, work in progress and finished goods. Advance payments received or paid are not considered as part of working capital calculation because do not represent significant item on balance sheet. Companies' performance variable turnover is adjusted by other operating income item (where prevailing volume of subsidies is booked).

This paper is developing from approached suggested by Losbichler et al. (2008) and extended by broader list of shareholder value drivers employed by e.g., Effinger et al. (2011), Hall (2018).

Following variables were defined as proxies of main value drivers:

- i. Year-on-year change of revenues (TO Y/Y) as a measure of annual growth,
- ii. EBITDA margin (EBITDAm) as a proxy of operating cost, resp. efficiency,

$$EBITDA\ margin = \frac{Operationg\ profit(loss) + Depreciation\ and\ amortization}{Turnover} \quad (1)$$

- iii. Working capital requirements measured by Cash conversion cycle (CCC),
- iv. Fixed assets utilization (FA_TO) measured as ratio of Fixed assets scaled by Revenues.

Cash conversion cycle (CCC) as the indicator of how long cash is tied up between procurement and sales developed by Richards and Laughlin (1980) is used as a time-based characteristic. As presented by Lind et al. (2012) cash conversion cycle consists of cycle times of inventories, account receivables and account payable and is defined as:

$CCC = DIO + DSO - DPO$, where DIO represents days of inventory outstanding, DSO represents days sales (receivables) outstanding and DPO represents days payables outstanding:

$$DIO = \frac{\text{Inventory}}{\text{Turnover}} * 365 \quad (2)$$

$$DSO = \frac{\text{Accounts receivable}}{\text{Turnover}} * 365 \quad (3)$$

$$DPO = \frac{\text{Accounts payable}}{\text{Turnover}} * 365 \quad (4)$$

Results and discussion

Single sector perspective

In this section attention shall be paid to the description of shareholder value drivers of individual sectors within predefined Czech Agro-Food supply chain.

Development of fixed assets utilization (fixed assets scaled by revenues) as a proxy of fixed assets usage in the production of the particular sectors of national economy is depicted in Figure 1. It is clear that primary agricultural production is employing far the most fixed assets to generate one unit of output. We observe clear upward trend

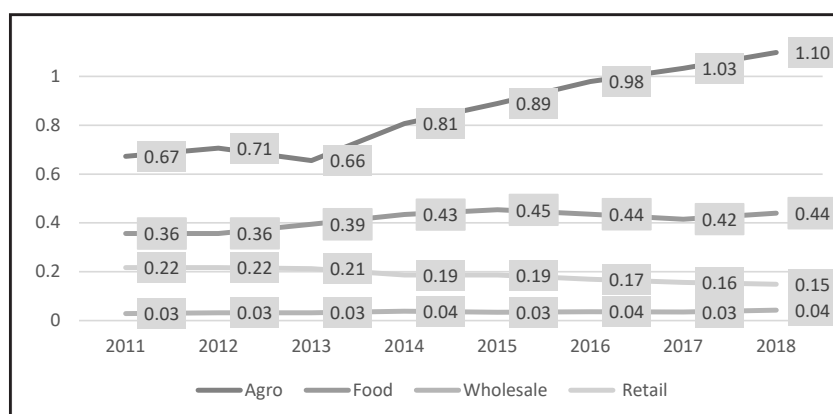
since 2013, with the latest data showing aggregated volume of fixed assets to be higher than achieved final output reaching 110% in 2018.

With the exception of Agro production sector that experienced significant increase by 64%, fixed assets utilization ratio remains relatively stable for the remaining sectors over the observed period. We suspect the difference to be probably driven by higher fixed assets purchase promoted by public support (different form of investment subsidies).

Figure 2 is representing average values (average of annual median values over the respective period of time) of profitability measured by EBITDA margin and performance captured by year to year Turnover change. At first sight, only Agro sector is achieving double digit profitability and surprisingly is managing constantly (with the exception of year 20017 and 2018) to outperform the other sectors. However, if public transfers effects (EU and national subsidies etc.) are suppressed, situation significantly changes and Agro sector average profitability falls down to -2% under no public support scenario, whereas Food sector was experiencing limited reduction only by -1.4%, and other sectors remain unchanged. Average performance is rather stable, where highest average growth was achieved by Retail sale sector during the analysed period.

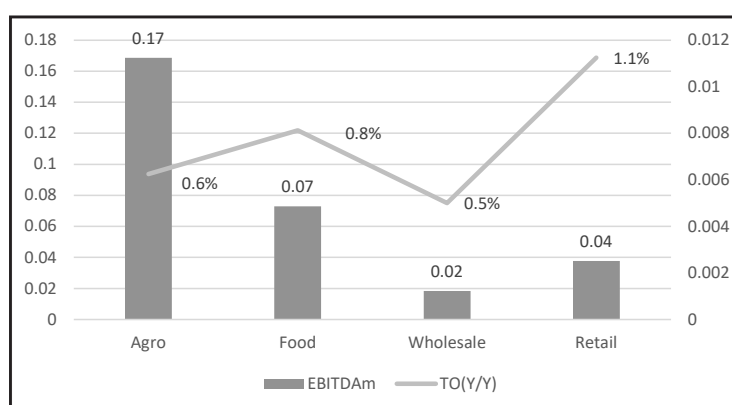
Cash conversion cycle as time-based characteristic is reflecting intensity of working capital employment on the company's level and is defined as by payment conditions to customer (ARDOH), suppliers (APDOH) and requirement for amount of inventories (INVDOH). Please note that due to undue weighting from outliers medians were utilized for all components and are reflected in days.

As depicted in Figure 3, for Agro sector cash conversion cycle has increased by significant



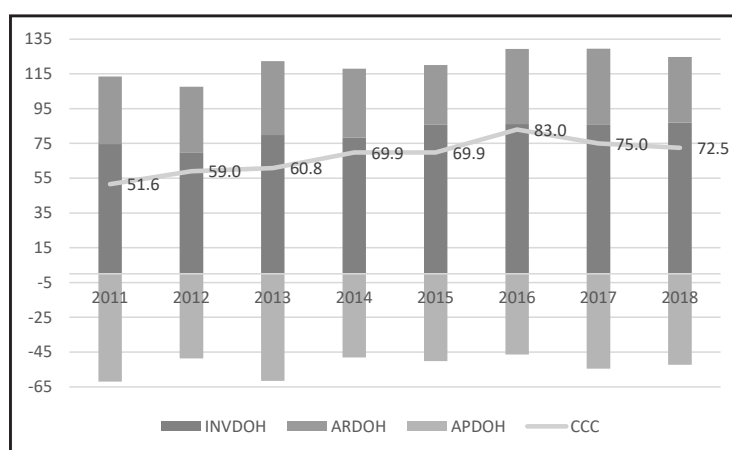
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Figure 1: Fixed assets utilization (annual median values).



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Figure 2: Annual growth and profitability (average values).



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Figure 3: Agro sector Cash conversion cycle

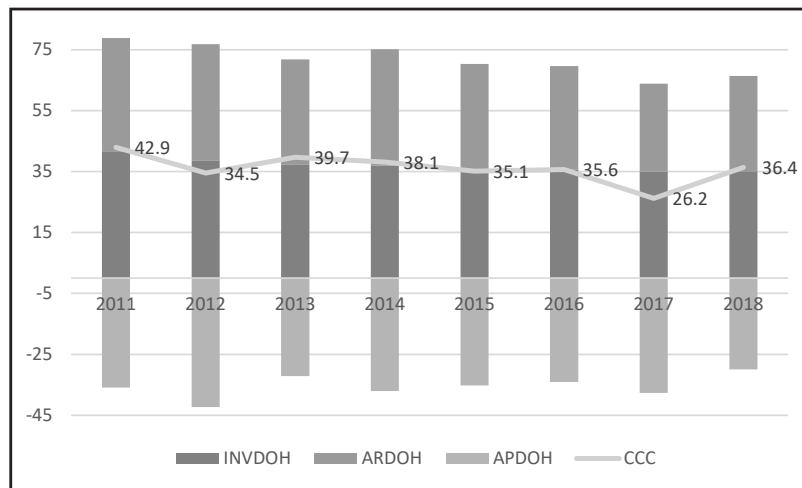
20.9 days (highest increase among observed sectors) ending with median value 72.5 days. Which is predominantly driven by extension of days inventory outstanding (+12.4 days) and simultaneously reduction of days account payables outstanding (+9.6 days). Level of inventories also remain relatively high (compare to other sectors) above 70 days.

As showed by Figure 4, Cash conversion cycle for Food sector has experienced reduction by 6.5 days ending with median value of 36.4 days. This change was caused by simultaneous decline of all components, namely days inventory outstanding (-6.5 days), days account receivables outstanding (-5.95 days) and days account payables outstanding (-5.9 days). At the same time particular components of Food sector cash conversion cycle are the most evenly distributed among observed sectors.

In Figure 5, Wholesale sector similar to Food sector has witnessed increase of cash conversion cycle

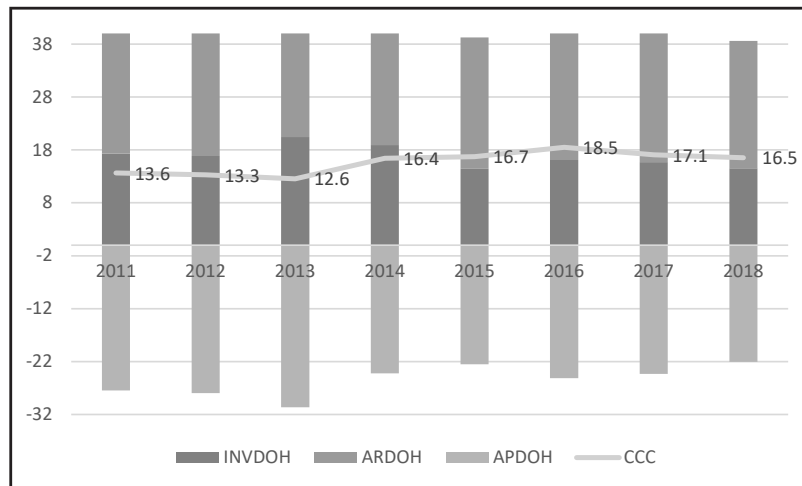
by 2.6 days generated by days account payables outstanding shortening by 5.4 days. Simultaneously prolongation of days account receivables outstanding by 2.8 days.

Cash conversion cycle of Retail sale sector has experienced a slight reduction by 2.5 days and ending with median value of 10.5 days as depicted in Figure 6. All components of cash conversion cycle have experienced changes over the time, highlighting days account receivables outstanding having declined by 7 days. At the same time days account receivables outstanding are achieving the lowest figures across all sectors, which is predominated by nature of its business (majority sale as cash operation). Days account payables outstanding were shortened by 6.3 days.



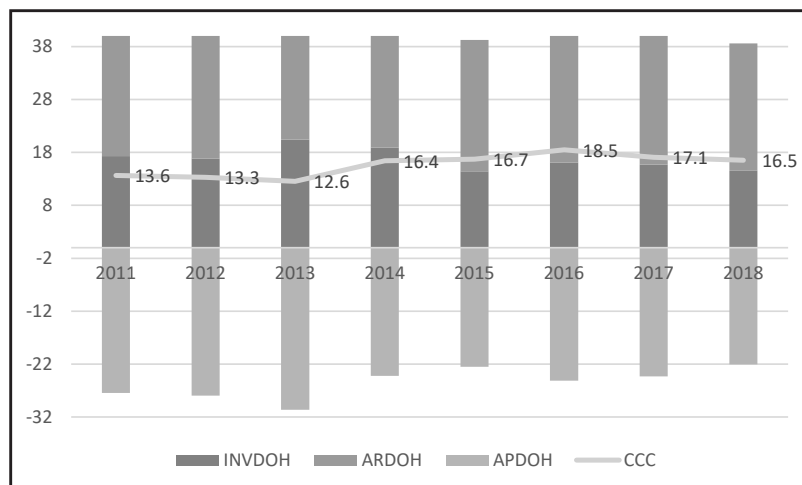
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Figure 4: Food sector Cash conversion cycle



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Figure 5: Wholesale sector Cash conversion cycle



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Figure 6: Retail sale sector Cash conversion cycle.

Supply chain network perspective

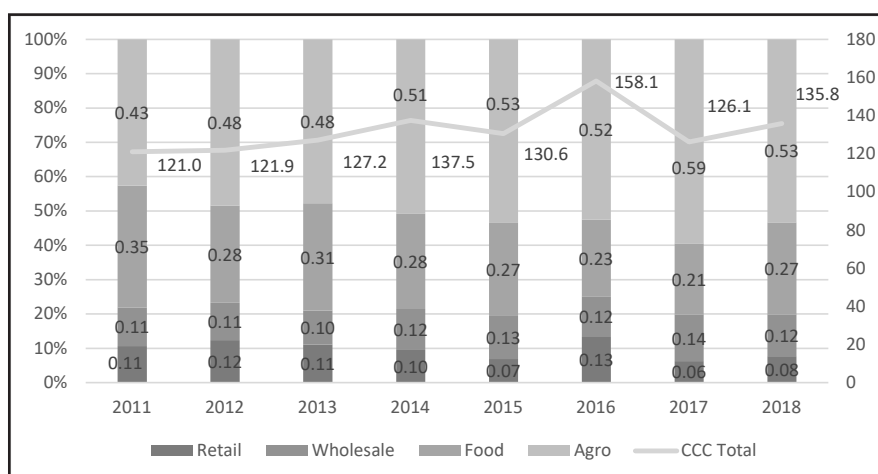
In this section we aim to put value drivers to a general supply financial value chain concept in order to explore the particular sector dynamics on the Czech Agro-Food financial supply chain shareholder value generation. Therefore, supply chain cash conversion cycle is defined as the sum of all subsectors cash conversion cycles, similar to Hofman and Kotzab (2010) approach and extended to sectoral value drivers' comparison.

As can be seen in Figure 7 cash conversion cycle for all sectors is positive, i.e., the Czech Agro-Food supply chain ties up significant amount of working capital for relatively long period of time, which has even extended over the observed period of time by 14.8 days (+12.2%). Agro sector jointly with Wholesale sector have experienced extension over the 2011-2018 period (rather significant

in the case of Agro sector) by 20.9 days and 2.9 days, respectively. Contrary to it Food sector (both C10 and C11) and Retail sale have reversely witnessed reduction by 6.5 days and 2.5 days, respectively.

The average share of particular sector is decreasing the closer its product gets to the final customer (valid almost throughout all years). In other words, Agro sector has achieved the highest share value contrary to the Retail sale sector with the lowest ones implicating more efficient working capital management in line with similar findings of Viskari et al. (2011) and Losbichler et al. (2008).

As in Table 1, it seems that Agro sector has experienced biggest changes within the Czech Agro-Food financial supply chain with respect to the capital intensity both on working capital (Cash conversion cycle +40.5%) and fixed assets (fixed assets utilisation +63.3%) engagement



Source: own processing

Figure 7: Share of particular sectors on supply chain cash conversion cycle.

NACE	Name	Description	Year	INVDOH	ARDOH	APDOH	CCC	FA Utilization	Annual growth	EBITDA m
A1	Agro	"Primary agricultura production"	2011	74.60	38.87	61.91	51.56	0.67	-0.04	0.15
			2018	86.95	37.79	52.29	72.45	1.10	-0.02	0.16
			Δ (%)	16.6%	-2.8%	-15.5%	40.5%	63.3%	-50.0%	6.8%
C10&11	Food	Food & Drink production	2011	2011.00	41.67	-37.18	-35.90	0.67	-0.04	0.06
			2018	2018.00	35.14	-31.23	-29.96	1.10	0.03	0.09
			Δ (%)	0.3%	-15.7%	-16.0%	-16.5%	63.3%	-192.9%	33.1%
G46	Wholesale	Wholesales	2011	2011.00	17.33	-23.78	-27.48	0.36	-0.02	0.01
			2018	2018.00	14.53	-24.08	-22.07	0.44	0.00	0.02
			Δ (%)	0.3%	-16.2%	1.3%	-19.7%	23.4%	-100.0%	34.1%
G47	Retail	Retail sales	2011	2011.00	25.62	-17.58	-30.30	0.03	-0.01	0.04
			2018	2018.00	23.90	-10.51	-23.96	0.04	0.04	0.04
			Δ (%)	0.3%	-6.7%	-40.2%	-20.9%	52.6%	-500.0%	4.9%

Source: own processing

Table 1: Summary of Economic Value Added drivers (median values).

level, which jointly negatively influenced EVA and consequently shareholder value generation over the respective period of time. These effects were offset by relatively high (achieved highest values within predefined supply chain sectors) profitability (annual median values of EBITDA margin fluctuated around 17%) that is without any doubts driven by generous public support in place. Without these transfers profitability was continuously negative (with exception of 2012).

From capital intensity point of view, the Food sector has improved its working capital management (Cash conversion cycle -15.2%) which was partly offset by increased capital expenditures leading to higher Fixed assets utilization (+23.4%). Relatively high profitability (annual median values oscillated above 7%) has increased over the time (+33.1%) and is less dependent on public support compared to Agro sector (only -1.4% drop in the case of public transfer suppressed scenario). Since Food sector is defined as a set of food producers and drink makers, it would be interesting to further decompose it to observe any potential inconsistency and dissimilarities between these two.

Wholesale sector experienced (similar to Agro sector) capital intensity reinforcement both on working capital management (Cash conversion cycle +21.3%) and capital expenditure (Fixed assets utilization +52.6%) level. Profitability measures seems to improve over the respective period of time significantly (-34.1%), but relatively low absolute values shall be considered as well as (average annual value oscillated below 2%).

Retail sale sector has accomplished the best results with respect to the capital intensity measures. Both working capital management (Cash conversion cycle -19%) and capital expenditures (Fixed assets utilization -31.6%) characteristics experienced reduction. EBITDA margin with average value around 4% was the most stable one across Agro-Food supply chain (only +4.9% change).

If we focused for simplicity and comparability on the most commonly used metric, i.e. cash conversion cycle, it can be stated that there is with high probability a leading sector within the Czech Agro-Food supply chain. Retail sale sector with its shortest cash conversion cycle (10,45 days in 2018), thus the lowest share on the total Czech Agro-Food supply chain cash conversion cycle (7,7% in 2018), reinforcing its position even further by reducing length of its cash conversion cycle over the respective period of time (-19%) seems to be leading sector. Above stated findings are suggesting

that within the Czech Agro-Food supply chain self-serving approach seems prevailing, i.e., leading most influential sector optimize its performance at the expenses of other downstream supply chain partners.

These results confirm findings obtained by Lobisher and Rothbock (2006) that studied almost 7.000 European companies including "Food stores" over the decade (1995-2004). The European Food stores (similar to Retail sale sector) have experienced significant reduction of cash conversion cycle from 1,5 days in 1995 to -11,6 days in 2004.

Conclusion

The intention of this text was to define the Czech Agro-Food financial supply chain and develop economic metrics in order to quantify potential economic value added generation and distribution among participating sectors within supply chain network.

Hypothesis 1 is valid only partly. Retail sale sector, which can be considered as an "interface" between the Czech Agro-Food financial supply chain and final customer is generating high shareholder value (cash conversion cycle lowest values, the second lowest fixed assets utilization, highest revenues growth and stable profitability). Contrary to it, Wholesale sector is experiencing deteriorating of shareholder value over the respective period of time by reinforcement of capital intensity measures (cash conversion cycle prolongation and fixed assets utilization increase) accompanied with very low profitability level. Special case is primary agricultural production (Agro), where expectations of very low shareholder value (the most remote sector from final customer within predefined financial supply chain) is offset by significant public transfers influencing all value drivers either directly or non-directly.

As can be seen from the text above, all value drivers are constantly changing over the respective period of time (years 2011-2018), both on single sector and financial supply chain network level leading to conclusion that financial supply chain is dynamic in its nature. Thus hypothesis 2 has to be rejected.

As already mentioned, primary agricultural production (Agro) faced specific conditions due to the significant public transfers in the form of subsidies etc. influencing non/directly all shareholders value drivers consequently reducing originally expected vulnerability. Especially overall sector profitability is driven by these transfers serving as "cushions" for related capital intensity.

Therefore hypothesis 3 has to be rejected.

Since, we employed four main value drivers influencing companies' economic value added, namely revenues growth, operating margin, cash conversion cycle and fixed assets utilization similar to Effinger et al. (2011), Hall (2018) instead of one single measure, the interpretation of obtained results may not be so straightforward.

Nevertheless, based on the comparison of obtained values of all employed value driver's metric, it seems that generation of shareholder value is not evenly distributed within the Czech Agro-Food supply chain and these "scissors" are expending over the respective period of time in favour of Retail sector (sector closes to the final customer) at the expense of others, especially of Agro sector.

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These findings are rising further questions about organization and management of the Czech Agro-Food supply chain. More detail elaboration and research on potential optimization that would benefit all supply chain counterparts and overcome current rather "self-serving" approach of supply chain echelons would be desired and needed.

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