Mária Lakatos – Éva Karai

Buy or Sell? Hungarian Carbon Credit Trade: Years of Learning

Summary: From the beginning, Hungary has played an active role in the trade of state-allocated carbon dioxide emission rights within the EU Emissions Trading Scheme. Our study focuses on carbon dioxide credit turnover of Hungarian firms in the period between 2006 and 2010, seeking to explore the impact of credit prices and accounting classification on trading behaviour of unit trade players in Hungary, in the presence of foreign ownership. Concentrated primarily in foreign-owned Hungarian subsidiaries, the transactions were taken from and tested on the basis of the entity-level database in the official EU Registry. Due to the specificities of the Hungarian carbon dioxide units market, i.e. the extremely high proportion of foreign ownership, the carbon credits behaved as special financial assets. The trade of units reflects not only the influence of the Kyoto Protocol, but the reallocation of these resources from subsidiaries to parent companies as well. The sales and purchases are not closely related to compliance-driven or fundamental demand; rather, main directions are defined by intra-group flows.

Keywords: carbon dioxide allowance, international accounting, taxation, profit shifting
JEL codes: M41, N74, Q56

I INTRODUCTION

The carbon credit trading system, increasing every year, had already started to address the problems involved in the accounting approach before it was launched ten years ago, and that was soon followed by tax considerations. Whilst the problem of accounting classification became the focus of research relatively early, the corporate tax and related transfer pricing issues of the trading of carbon credits are considered to be areas unexplored to date.

Furthermore accounting – as the area responsible for enterprises' external and internal data reporting – is involved in several aspects of emission rights. One major issue was whether carbon credits embodying emission rights can be recognised as assets, and if so, what assets. The definition and classification of emission right itself is theoretically unclear and thus causes serious problems in practice as well. Opinions are also divided as to the value at which emission rights should be recognised as assets.

For companies, whether they should treat this new phenomenon as a right under intangible assets, as securities or even as inventories is open to debate (e.g. Andor et al., 2008; Bebbington et al., 2008; Reizinger-Ducsai et al., 2010; Warwick et al., 2012; Karai et al., 2013). Even at an early stage, *Cook* (2009) highlighted the fact that allocated rights also had a "currency" function, to be used to satisfy a highly probable future liability. Warwick and Ng (2012) argue that the lack of defini-

E-mail address: lakatosm@finance.bme.hu
karai@finance.bme.hu

tive accounting guidance has resulted in different accounting practices among companies operating under the EU ETS[1], as a result of which the comparability of company performance itself has become questionable.

According to accounts for 2008, units received through state allocation, that is, as grants, were recognised as intangible assets by 11, as inventories by 2 and as other assets by 6 out of the 26 largest emitters registered in the EU ETS. (The remaining companies did not disclose their figures.) Similar ratios are found in relation to the initial recognition of purchased carbon credits (Lovell et al. 2010). The picture is also mixed, in both theoretical and practical terms, regarding the measurement of the obligations and provisions arising from the repayment of carbon credit. The measurement of emission units received as a grant is a controversial area; at the same time – because of the quantity of the allocated carbon credits – it may have a considerable impact on the development of individual companies' financial positions and performance (e.g. Bebbington et al. 2008; Reizinger-Ducsai, 2011b; Lovell et al., 2010; 2013; Karai et al., 2013). *Medina* and *Pardo* (2013) focused on EUAs' role in stock exchanges and concluded that the behavior of those assets differed from other, common commodities, futures or financial assets. They pointed out that EUAs were a new asset class.

Such a profit-related inclusion will influence both the tax base and the process of corporate tax calculation. Not only does the value of emission units recognised as inventories or as a financial asset affect the size of the tax base differently; the issue of the application of market prices (arm's length principle) should also be taken into account. Within a holding company, the application of prices other than the market price diverts member companies' recognised profits from real achievement within the intrafirm accounts. That is why it is a priority of tax authority audit objectives throughout the world. Needless to say, the current system offers the opportunity to governments to favor domestic industries in the EU ETS, e.g. by imposing external costs upon other countries and their firms (Brandt et al., 2014).

Other studies such as Lise (2010) and *Zapletal* and *Moravcová* (2013) have emphasised the impact of the EU ETS not only on profits but also on output prices. *Bonenti* et al. (2013) evaluated the EU ETS impacts on the profits of the Italian electricity market, and demonstrated that increases in power prices depended not only on the level of CO_2 allowance prices, but also on the structure of the power market.

Thus, from the corporate taxation perspective, it is not the classification itself, but the potential transfer between revenues and expenses and the amount of such a transfer that affect the amount of tax payable. In addition to the modification of the tax base due to the price change, transfers may occur due to non-existent deals, that is, the corporate tax base is to be calculated as if the sale and purchase had never happened. From this aspect, the internal financial transactions, loan contracts and provision of services are particularly important, and the sale of carbon credits within corporations is also considered relevant due to its specific nature. Studies on corporate finance practice (e.g. Andor et al., 2011) conclude that the practice is influenced both by firm size and multinational management culture. Our study also seeks to address the issue of whether in the present situation, carbon credit trading may have become a part of cross-border profit shifting regardless of the original objective of its creation, i.e. to minimise green house gas emissions.

METHODOLOGY AND DATA COLLECTION

Our research processed the data of emission unit trading in Hungary; we analysed the transactions that took place between 2005

and 2010, divided allowances into clusters on the basis of their characteristics, and then examined exactly why Hungarian companies sell or acquire CO_2 emission units. One of the unique circumstances of Hungarian credits' release is the very high proportion of foreign capital in the energy sector. The share of direct and indirect ownership exceeded fifty per cent in the period, which makes it suitable for modeling emissions trading carried out among affiliated companies. Although carbon credit trading involves many types of unit that differ in their properties, we only examined those traded in the EU ETS, because, based on the turnover data, such units amounted to 99 per cent of the Hungarian volume (not including state sales). Using data included in the official output register, we established which companies sold or acquired credits, identified sellers and customers and determined the role played by the parent–subsidiary relationship in trade. In addition, we compared the number of emissions with verified emissions and surrendered units. The data of the EU ETS trading scheme were recorded in the national registers until 2008, but since then it has been mandatory to record them in the EU ETS Transaction Log system in the EU. The individual data record transactions and the sales of the Hungarian registration authority and its accounts required after the end of the reporting period are also displayed. In order to establish a fair and complete view, sales and purchases by the state were filtered out; these could be the subject of a separate analysis. The EU's trade settlement system does not contain prices, only units; consequently, the data were compiled based on the number of units. The ownership background of companies with emission allowances in Hungary is included in the electronic public company register; this was used to determine whether they are affiliated or not. We assume that for affiliated undertakings, the interests of the entire corporate group must prevail over those of the single and autonomous entity during the sale and purchase.

CARBON CREDIT AND TAXATION

One of the features of the Hungarian CO_2 market is that, although the country's small size and its energy industry are considered to be insignificant by European standards, it plays an active role in carbon credit trading. The position occupied in international trading is not measured by the quantity of carbon dioxide traded, but by the number of trading partners' countries, according to Ellerman and Trotignon (2009); with 25 member countries, the highest score is awarded to the member state trading with 24 of them, and at the bottom of the scale are those that do not deal with any countries. In that classification, Hungary is included in the group of active sellers and buyers, along with Poland, the Czech Republic, Latvia and Slovenia. The classification shows that the clusters thus created reflect the intensity of the trading activity rather than the market's level of development *(see Table 1)*.

The dominance of energy companies is apparent in allowance allocation; out of 243 companies with CO_2 emissions, the units of only 34 firms belong to the energy industry, but they claim 80 per cent of the total annual credit.

At the same time, the strong presence of foreign ownership within the international holding structure (IEA, 2011) highlights the accounting, tax optimisation and transfer pricing practices in the Hungarian taxation system, which is not as well equipped as that of other EU countries. The issues of corporate transfer pricing are related to the general obligation to apply the arm's length prices. In related undertakings, parties should behave in-

Table 1

TRADE INTENSITY IN THE EU IN 2005–2010

	2005	2006	2007	2008	2009	2010
Austria	11	17	18	16	17	17
Belgium	6	12	12	12	14	15
Cyprus	0	0	0	0	0	1
Czech Republic	8	14	13	12	13	10
Denmark	12	20	19	18	21	19
Croatia	6	7	9	6	8	14
Finland	10	15	14	15	15	22
France	13	22	21	20	21	20
Germany	13	19	18	18	19	18
Greece	0	4	4	5	4	7
Hungary	0	9	9	7	12	9
Ireland	4	11	5	12	12	13
Italy	0	12	12	13	13	18
Latvia	4	9	8	8	9	8
Lithuania	4	8	10	6	10	7
Luxembourg	0	4	2	4	7	9
Malta	0	0	0	0	0	0
Netherlands	15	22	20	22	22	20
Poland	0	12	10	11	10	15
Portugal	3	5	7	8	11	15
Slovakia	5	10	8	11	11	11
Slovenia	0	4	4	8	8	6
Spain	7	15	13	16	17	19
Sweden	7	12	9	9	12	20
United Kingdom	14	21	21	21	21	20

Source: author's data collection based on the EU ETS Transaction Log

dependently in their trade relations with each other as if they were third parties. If their prices deviate from this principle, they will have to adjust their tax base to the market price level in line with the deviation, and calculate the tax payable accordingly. The obligation to apply market prices extends to all transactions with each other, and carbon credits are no exception to this rule. The non-uniform classification of carbon credits can also cause problems in taxation, which may arise not only in the performance of corporate tax obligations, but also in the value-added tax system. European national solutions vary widely. Only Romania classifies carbon credits as financial instruments and thus exempts them from

VAT payment obligations. France was granted exemption with respect to the object of taxation, in the Netherlands it falls under the exceptional reverse taxation in order to prevent VAT fraud, in Great Britain it belongs to the 0 bracket and elsewhere, including Hungary, it is taxed at the normal (27 percent) rate.

If a multinational firm has to file for income taxation in more than one country, it has to be decided how the firm's overall income is divided (Becker, 2012). For decades, the possibility of profit shifting within companies has received particular attention in literature. However, the emission unit (in any form) is a completely new asset that creates a special situation due to its specific nature, whilst the restriction of international trade in carbon credits already influences corporate behavior in a direction that is contrary to the available emission savings (Fischer, 2006). The distortion may only increase if and when, due to an insufficient transfer pricing practice, the transfer of carbon credits is primarily aimed at transferring profit. The outcome falls outside of the scope of both the environmental and the taxation policy objectives. Taking into account the concept (which was only theoretical when it was established in 2005), in our study we seek to demonstrate that the distortions mentioned above not only have been proven by the experience of the first six years, but have also assumed new dimensions. The distortion increases if and when the carbon credits are issued and traded between a parent and a subsidiary in the form of cross-border transactions.

According to the generally accepted views, the financial ties between parent and subsidiary companies are basically determined by the difference between the effective tax rate payable in the home country and that payable in the country of its subsidiary(ies) (e.g. Hines,1999). These findings have been met with various reactions: some studies have sought to determine why for many years foreign-owned U.S. subsidiaries have declared a zero corporate tax base (Collins et al., 1997). Huizinga and Laeven (2008) found evidence that several European countries benefit from the profit transfer, primarily at the expense of Germany's budget. The lack of comparable transactions data required for the application of arm's length prices provides for considerable room for maneuvering at multinational level (Luckhaupt et al. 2012). At the same time, however, a number of researchers have pointed to the dark side of profit shifting, arguing that its cost should also be taken into account to ensure that corporate behavior is predictable. Conversely, *Dischinger et al.* (2014) pointed out the fact that leading companies of international groups played a crucial role in determining the direction of the profit transfer. The case study of *Rossing* (2013) discussed how firms were affected by a functional tax strategy in order to minimise tax risk exposure in a multinational setting.

Accepting the findings referred to in literature, our study examines whether carbon credit trading was necessary or not within a company group.

CARBON CREDIT AND ACCOUNTING

For the purposes of this paper, we limited the issue of accounting classification to the analysis of the following problems: classification, measurement and the effect on corporate profits. The latter is highly dependent on the accounting system used.

If financial statements are prepared in accordance with the International Financial Reporting Standards, there is no special standard or interpretation to account for emission allowances. In relation to carbon credits acquired as a government grant, the IAS 20 Accounting for Government Grants and Disclo-

sure of Government Assistance standard offers a choice to entities. Accordingly, carbon credits are recognised at fair value and the government grant is shown in the same amount as deferred income, but it is also possible to recognise emission rights at a value netted against the amount of the government grant. In relation to both the emission allowances and the government grant, this can mean recognition practically at zero value. When carbon credits are treated as inventories, the relevant requirements of IAS 2 Inventories should be applied, which means that the units should be measured at cost or at the net realisable value, whichever is the lower at the end of the reporting period. If the emission rights are recognised at zero value, it follows that due to the lack of eventual appreciation, the rights constantly remain at zero. Following the requirements of IAS 37, an obligation is recognised in the gross amount at the value corresponding to the estimated emissions associated with the compliance period. The amount shall be the best estimate of the expenditure required to settle the obligation at the end of the reporting period.

In Hungary, there is no accounting rule or professional position regarding the accounting treatment of emission rights. Accounting treatment based on IFRS could not be adopted in the given period because companies were not allowed to prepare their individual financial statements according to IFRS. It is an important milestone that from 2016 many local companies are allowed, and from 2017 listed companies and certain financial services providers are obliged to prepare their individual financial statements according to IFRS. *Beke* and *Tiszberger* (2012) pointed out that in Hungary the number of decisions on voluntary adoption of IFRS was relatively small. *Andor* and *Rózsa* highlighted that the structure of IFRS is difficult to apply for most professionals in Central Europe because they are accustomed to working with rules-based accounting systems (Andor et al., 2013).

By examining the accounts of undertakings in the period between 2005 and 2007, Andor and *Fazekas* (2008) established that the majority of entities recognised the rights as intangible assets. By evaluating a questionnaire survey carried out among the companies concerned, *Reizinger-Ducsai* (2011a) highlighted the confusion and internal contradictions of the accounting practices in place, which affect both the recognition and the subsequent measurement of emission rights. As regards recognition, the accounting practice has been somewhat clarified, but the measurement procedures applied remain contradictory. Hungarian companies' emission rights are generally recognised as inventories, but their measurement shows a very different picture even today.

On which principles is this accounting based? Entities take into account the emission rights obtained free of charge at the current market value as deferred income, which is released and recognised as income simultaneously with the derecognition of the allowances. The derecognition may take place using the FIFO method or at the average price. Impairment losses may be recognised if the market value remains permanently (more than a year) and significantly below the carrying amount and emission allowances are written down to the market value at the date of preparation of the balance sheet. Provisions are recognised in the spirit of prudence and not as present obligations. In the case of emission allowances, this means that provisions are only recognised if the entity does not have enough units to cover the current year's emissions. Expense is only recognised for the missing units so that the estimates are based on the market value available as of the date of the preparation of the balance sheet.

The move from free allocation to full auc-

tioning could eliminate the measurement problem by the initial recognition of allowances, but differences might remain between the price at auctioning and the price at fair value because of the market volatility in the price of emission allowances (Lovell et al., 2013).

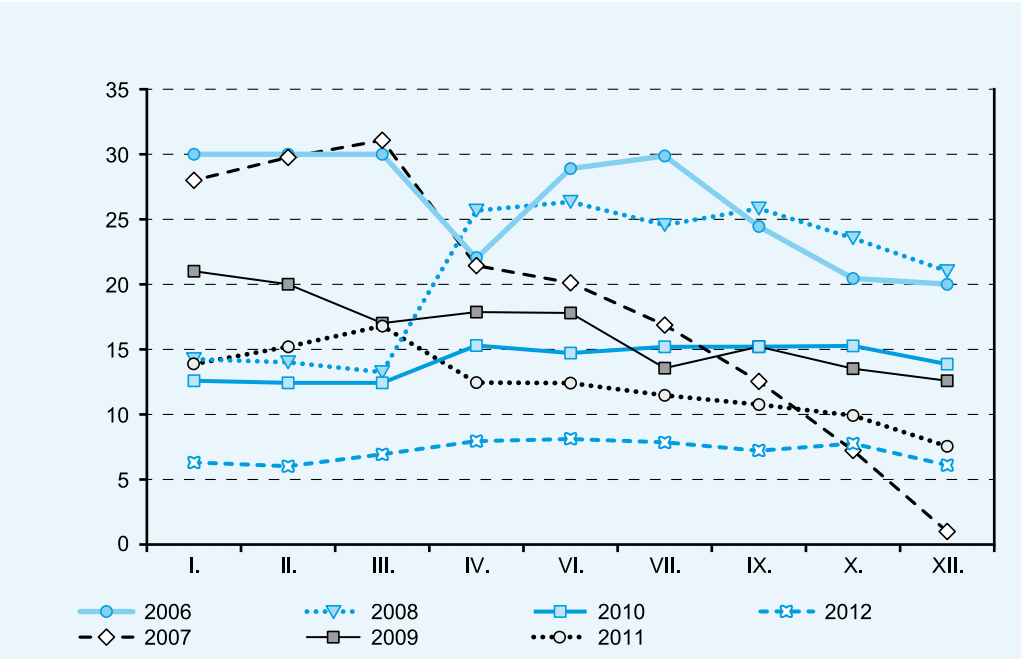
TRENDS IN THE HUNGARIAN MARKET

For the analysis of the situation in Hungary, the main trends of the EU ETS market had to be taken into account. The vigorously growing trade (Calel, 2013), the decrease in emissions after 2008 and the dramatic decline in the GDP characterised the market, in which – despite all the expectations – the prices already declined significantly in the first year. *(See Chart 1)*

Even before the start of EU ETS system, several authors investigated the efficiency losses of output-based allocation schemes and pointed out their effects on the global environmental effectiveness and the cost-incidence of abatement (e.g.Böhringer et al., 2005.) The price developments and the forecast thereof attracted attention immediately, as the stock exchange trading briefly promised the possibility of free extra profits (windfall profits). However, the calculations were literally dragged away by the 2008 crisis, the economic downturn and the decline in the GDP, while at the same time, a portion of the emission units became obsolete. A substantial surplus was generated on the market, the extent of which is estimated at 2 billion emission units. Considering the economic forecasts, the surplus may be absorbed by the EU ETS by 2030 (Kossoy et al., 2012). Problems

Chart 1

DEVELOPMENT OF CARBON CREDIT PRICES



Source: www.point.carbon.org, www.eex.org

of this kind have spurred the EU to negotiate further reforms of its trading scheme (Wettestad, 2014).

Thus, the unexpected twist pushed the emission unit price into a permanent decline, which – as is clearly visible – recovers slightly before the end of the reporting period (mostly the year-end) and the date of the unit surrender (the end of April), but approximated zero both at the end of the first supplementary period in 2008 and the end of the first complete period in 2012. In turn, uncertainties in expectations over future allowance prices cause investments to be postponed (Hepburn et al., 2006).

In terms of quantifiable trends, the Hungarian carbon credits market followed the European movements and was characterised by a significant volume of external and internal trade. Primarily, compliance with the Kyoto Protocol was considered to be companies' main objective; meanwhile, the structure of energy resources would change significantly (e.g. Erdős et al. 2012). *(See Chart 2)*

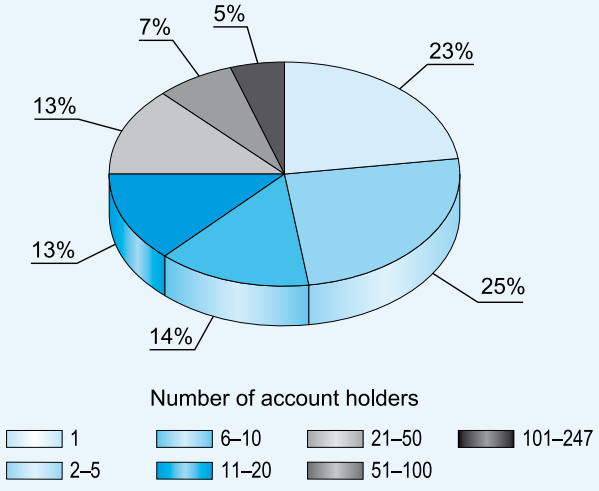
The summary of trade data shows energy companies dominant role is unwavering not only in allocation, but also in trade. *(See Table 2)* According to the table showing the five largest sellers in 2008–2010 *(see Table 5)*, only companies specialising in financial investments could approach the turnover of the biggest holder of emission units.

With one exception, being a Hungarian state-owned company, the companies licensed in the electricity sector have Western European owners, the largest European corporations, which acquired ownership of the Hungarian power plants in the 1990s.

The transactions can be divided into two groups: either the parent and subsidiary companies traded the units with each other, or the excess was sold to a Hungarian or foreign intermediary, and their deficit was covered from such sources. In other words, trade among

Chart 2

ACCOUNT HOLDERS BY CREDIT IN 2005



Source: author's analysis based on the EU ETS Transaction Log

Table 2

ALLOCATION OF CARBON CREDITS AMONG INDUSTRIES AND COMPANIES IN 2008–2012

Sector	Number of companies	Ratio	Number of credits
Electric power	12	51.45	12,414,604
District heating	34	6.51	1,570,299
Own purpose combustion devices	57	13.28	3,204,569
Sugar production	3	1.37	330,433
Storage and transportation of natural gas	2	1.16	280,569
Oil refining	1	5.57	1,344,469
Coking	2	0.73	175,154
Metallic roasting and sintering	3	6.75	1,628,103
Cement	5	9.46	2,282,222
Glass	6	1.18	284,960
Bricks, tiles, pulp	122	2.55	615,327
Total	247	100.00	24,130,709

Source: National Allocation Plan of Hungary

licensed credit holders is completely absent, which has otherwise been gaining increasing prominence in the EU ETS market (Kossoy et al. 2012).

The situation of Hungarian companies was analysed on the basis of allowance allocation in terms of whether their needs were covered by free state carbon credit. In the first three years (the supplementary period), there was a clear carbon credit surplus *(see Table 3)*, which offers the conclusion that Hungary was in a net selling position.

The surplus shown in the first stage was not a surprise. However, the direction of trade did not imply effective economic action, since the Hungarian market had a surplus (the difference between the emission and the use was about 11.8 million units in the first three years), then about 10.4 million units were transferred abroad, while 1.3 million were purchased by companies that themselves had a surplus, of which, according to some surveys, more than 2 million units lost their value on company accounts without being surrendered (Fazekas, 2010), and the time series show that this trend continued until 2010. The statistics show an ever-increasing purchase and sale turnover, regardless of the fact that only selling would have been the primary interest of the companies. The statistical data required adjustment in that the year 2009 was unusual in several respects. On the one hand, the allocation of Hungarian units was suspended for a year, so the companies were forced to import, and on the other hand, in this period, the turnover across Europe soared, because the transformation of differences within the VAT system and in some cases the so-called carousel fraud had also begun.

The trend reversed in 2010, when the allocation of free credit did not meet the demand and thus the companies were forced to increase their foreign purchases. At the same time, the domestic demand was mainly met through traders, for speculative purposes, and the fundamental trading for compliance pur-

Table 3

TRADE INTENSITY IN HUNGARY IN 2005–2010

Year	Allocation	Foreign sale	Foreign purchase	Verified emission	Allocation-Verified emission	Net import	Allocation +Purchase – Sale
2005	30,869	630	6,475	26,162	4,707	5,845	36,714
2006	30,869	549	2,806	25,846	5,023	2,257	33,126
2007	30,945	344	1,379	26,835	4,110	1,035	31,980
2008	25,120	1,861	10,059	27,237	–2,117	8,198	33,318
2009	23,600	4,161	17,597	25,701	–2,101	13,436	37,036
2010	25,701	9,050	14,453	24,365	1,336	5,403	31,104

Source: author's analysis based on the EU ETS Transaction Log database

Table 4

EXTERNAL PURCHASE AND SALE (IN THOUSAND UNITS)

	Purchase			Sale		
	2008	2009	2010	2008	2009	2010
Number of units	1,730	9,050	4,161	1,408	13,428	8,189
Number of transactions	29	239	157	28	261	191
Share of electricity %	31.39	26.58	70.83	83.46	25.27	31.23
Number of transactions by electric power stations	8	132	123	21	68	49

Source: author's analysis based on the EU ETS Transaction Log database

poses was placed outside the borders. *(See Table 4)*

Subsequently, the selling and buying positions of the companies with the most emission units were examined. Due to the extremely high degree of concentration (in practice five companies determined the overall turnover), power plants in 100 per cent or majority foreign ownership represented a significant part of the total Hungarian turnover. The high volatility was due to the fact that the annual action of a single large power plant skews the proportions; for example, the largest holder in 2008 alone carried out half of the purchases of the total power plant sector. *(See Table 5, 6)*

The purchases performed for speculative purposes rather than specifically for compliance were slightly lower in 2008–2009, speculative transactions including those in which at least one party had no state-allocated emission allowance, only a trader account. In terms of turnover, the behavior of the power plants was not different from that described in the supplementary period. The real needs (compliance demand) were not consistent with trade, and they bought even when there was a surplus, or sold if there was a deficit between emissions and consumption (verified emission).

A possible explanation for the demand in the energy sector is the accumulation of al-

Table 5

LARGEST PURCHASERS

2010		2009		2008	
Trader A	427,000	Oil Co. A	2,098,900	Power Plant B	1,156,000
Trader B	1,106,985	Trader B	1,269,150	Power Plant C	173,000
Power Plant A	98,937	Trader C	897,870	Power Plant D	90,000
Other Ind. Co. B	89,734	Power Plant B	575,000	Power Plant E	75,000
Other Ind. Co. C	83,660	Trader A	372,000	Other Ind. Co. A	60,773
5 largest purchasers	*3,806,316*	*5 largest purchasers*	*5,212,920*	*5 largest purchasers*	*1,554 773*
Total purchases	*4,161,145*	*Total purchases*	*9,050,327*	*Total purchases*	*1,861,123*
*Without NIFENW**	*4,161,145*	*Without NIFENW**	*9,050,327*	*Without NIFENW**	*1,730,123*

* National Inspectorate For Environment, Nature and Water

Source: author's analysis based on the EU ETS Transaction Log database

Table 6

LARGEST SELLERS

2010		2009		2008	
Trader A	2,432,000	Oil Co. A	4,902,800	Power Plant I	80,000
Power Plant A	1,817,549	Trader C	893,000	Power Plant J	44,291
Power Plant F	793,894	Power Plant A	871,238	Power Plant E	50,000
Power Plant G	600,000	Power Plant H	770,257	Power Plant K	35,000
Trader B	575,000	Power Plant G	700,000	Other Ind. Co. D	135,000
5 largest sellers	*6,218,443*	*5 largest sellers*	*8,137,295*	*5 largest sellers*	*244,291*
Total sales	*8,342,435*	*Total sales*	*17,597,401*	*Total sales*	*10,058,700*
Without NIFENW	*8,189,581*	*Without NIFENW**	*13,428,570*	*Without NIFENW**	*1,408,700*
Share of the 5 largest sellers	*75.93%*	*Share of the 5 largest sellers*	*60.60%*	*Share of the 5 largest sellers*	*67.03%*

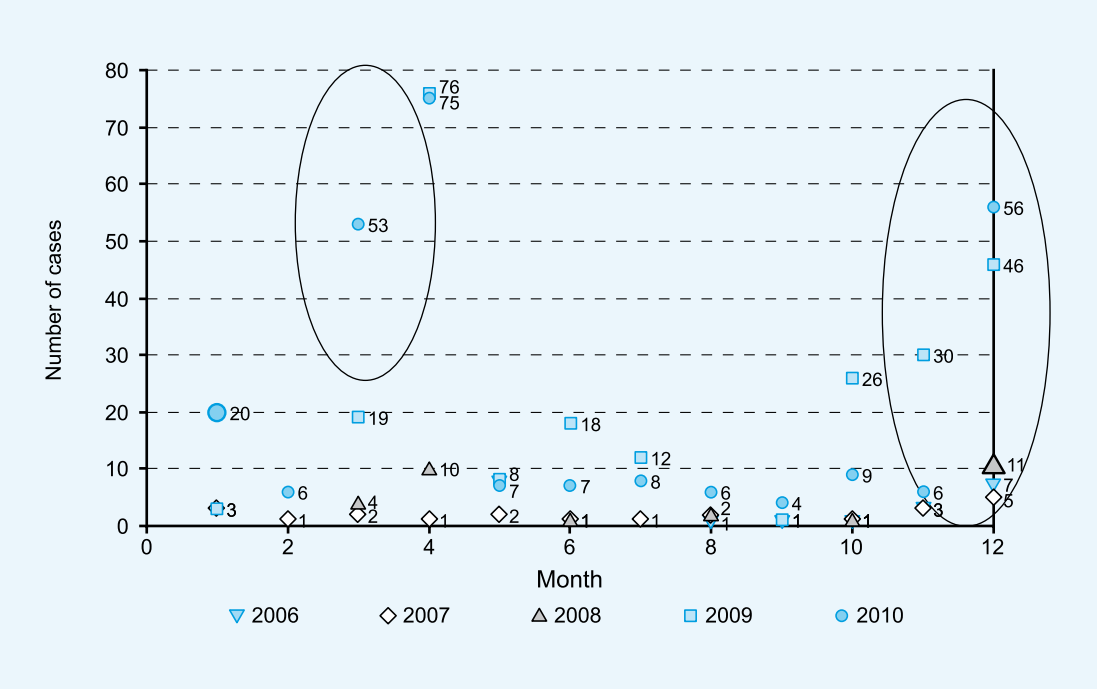
* National Inspectorate For Environment, Nature and Water

Source: author's analysis based on the EU ETS Transaction Log database

lowances for future use (also referred to as banking). From 2012, power generators no longer receive allowances for free. On the other hand, Hungary is one of the 8 member states that have benefited from the related derogation, whereby the EU ETS Directive permits existing power plants to be allocated, although in decreasing numbers, free allowances for a transitional period until 2019. Examining the banking of allowances, *Neuhoff et al.* (2012) identified three main reasons – arbitrage, hedging and speculation – and three main actors – power generators, industry actors and financial actors, to such transactions. Based on their interviews with large operators, power companies invest in allowances almost exclusively to hedge their compliance needs, i.e. for future use.

Chart 3

NUMBER OF TRANSACTIONS BY MONTH



Source: own calculations based on the EU ETS Transaction Log

After that, we examined the timing of the performance of each transaction, and the distribution is shown in *Chart 3*.

In practice, 90, 31.5 and 62.1 (2008, 2009, 2010) per cent of the sale and purchase transactions, respectively, were concentrated in the first and fourth quarters. In the first quarter, the surrendering of used carbon credits was carried out by April 30, and the last quarter was the period of financial closing and the improvement of corporate profits – one way of which may be the reallocation of carbon credits.

CONCLUSIONS

In our analysis, we examined five years' worth of data available to the public about the Hungarian emission units market. Although the Hungarian market trends do not differ from the European ones, it is striking that due to the dominance of the energy sector, and within this the large extent of foreign participations, most of the turnover is exchanged between parent companies and their subsidiaries. The sales and purchases are not closely related to compliance-driven or fundamental demand; rather, main directions are defined by intra-group flows. According to our analysis, virtually no emission units are circulated within the country. Subsidiaries put their turnover through the parent company even if there were sellers or buyers in Hungary.

In connection with carbon credit trading, our analysis showed that buyers had no actual need for credit; in other words, what related parties provided for each other was not trade in the emissions units, but rather an opportunity for loss realization or profit shifting. Moreover, unharmonised accounting regula-

tions coupled with the characteristics of Hungarian corporate taxation and the complete absence of withholding tax payments virtually provided a free ticket for profit shifting in this specialised market. Our study led us to the conclusion that in spite of the identical allocation principles in Europe, companies are not in equal positions, as a result of which when there is no supplementary regulation – such as a withholding tax on the international sales of carbon credits – these units may become a real benefit on parent or any other related companies' balance sheets.

The trading behaviour of Hungarian entities in the energy sector was influenced by group interests and by national accounting practices.

The different accounting solutions applied to carbon credit in Hungary highlight companies' need for detailed professional guidance. However, the provisions of the Hungarian Act on Accounting also lead to the delayed recognition of the incomes and expenses relating to carbon credit compared to the actual time of carbon dioxide emissions. Pursuant to the rules for provisions, expenses are usually not recognised in the year of emission, only later by the derecognition of the allowances (e.g. by rendering the units in a subsequent period). Through the requirement of permanence for the recognition of impairment, the book value of carbon credit often remains at a higher level, causing expense again to be shifted to the period in which credit will be derecognised. The presentation of deferred income from the release of government grants is also essentially linked to the derecognition of the asset rather than to the financial year in which the emission occurred. The delayed presentation of profit may also have the consequence of failure to provide a true and fair view.

The accounting challenges of emission allowances do not only cause difficulties in Hungary. The system of IFRS also lacks a consistent set of accounting standards or interpretations, making room for a wide range of solutions that differ by country and company. Accounting for the economic transactions relating to carbon credit is a highly complex task, so international guidance is urgently needed.

Our findings concerning players of the Hungarian energy sector reveal that today the system of carbon credit trading primarily serves group objectives rather than environmental ones. The accumulated credit surplus basically hinders the efficient operation of the system in accordance with its original objectives, which calls for a comprehensive impact analysis in much greater depth than that carried out before the system was launched.

Note

[1] Now the European Union Emissions Trading Scheme (EU ETS) is the largest multinational greenhouse gas emissions trading scheme in the world. The EU ETS today operates in 31 countries (the 28 EU member states plus Iceland, Liechtenstein and Norway). Under the EU ETS, companies with greenhouse gas emissions receive free emission units called European Union Allowances (EUAs) based on pre-defined credits, which they can sell to or buy from one another as needed. Once a year, companies must surrender enough carbon credits to cover their emissions for the year and local registries (national registers) will cancel or retire them. Companies that do not surrender an adequate number of credits, however, have a grace period in which to produce the additional credits needed before facing financial penalties. If a company reduces its emissions, it can keep the spare credits to cover its future needs or sell them to another company that is short of allowances.

Literature

Andor, A. – Fazekas, D. (2008): Handling of the emission law from the point of view of enterprises: Accounting issues. *Budapest Management Review.* Vol. 39, No. 3, pp. 44–59

Andor, G. – Rozsa, I. (2013): Should codification emerge in IFRS? Does form of regulation matter? *Acta Polytechnica Hungarica,* Vol. 10, No. 8, pp. 187–204

Andor, G., Mohanty, S. – Toth, T. (2011): Capital budgeting practices: A survey of Central and Eastern European firms. *European Financial Management Association: 2011 Annual Conference,* Braga, Portugal, pp. 1–45

Bebbington, J. – Larrinaga-Gonzalez, C. (2008): Carbon trade: Accounting and reporting issues. *European Accounting Review,* Vol. 17, No. 4, pp. 697–717

Becker, J. – Fuest, C. – Clemens, M. (2012): The nexus of corporate income taxation and multinational activity. *Finanzarchiv: Public Finance Analysis,* Vol. 68, No. 3, pp. 231–251

Beke, J. – Tiszberger, M. (2012): International Accounting Standardisation in Hungarian Practice. *Public Finance Quarterly*, 57(4), pp. 412–425

Böhringer, Ch. – Lange, A. (2005): On the Design of Optimal Grandfathering Schemes for Emission Allowances. *European Economic Review,* Vol. 49, No. 8, pp. 2041–2055

Bonenti, F. – Oggioni, G. – Allevi, E. – Marangoni, G. (2013): Evaluating the EU ETS impacts on profits, investments and prices of the Italian electricity market. *Energy Policy,* Vol. 59, pp. 242–256

Brandt, U. S. (2014): A blind eye to industry-level corruption: The risk of favoring domestic industries in the EU ETS? *Energy & Environment,* Vol. 25, No. 2, pp. 263–279

Calel, R. (2013): Carbon markets: A historical overview. *Wiley Interdisciplinary Reviews – Climate Change,* Vol. 4, No. 2, pp. 107–119

Collins, J. H. – Kemsley, D. – Shackelford, D. (1997): Transfer pricing and the persistent zero taxable income of foreign controlled U.S. corporations. *Journal of the American Taxation Association,* Vol. 19, Supplement, pp. 68–83

Cook, A. (2009): Emission rights: From costless activity to market operations. *Accounting, Organizations and Society,* Vol. 34, No. 3, pp. 456–468

Dischinger, M. – Knoll, B. – Riedel, H. (2014): The role of headquarters in multinational profit shifting strategies. *International Tax and Public Finance,* Vol. 21, No. 2, pp. 248–271

Ellerman, A. D. – Trotignon, R. (2009): Cross border trading and borrowing. *Energy Journal,* Vol. 30, No. 2, pp. 53–77

Erdős, P. – Ormos, M. (2012): Natural gas prices on three continents. *Energies,* Vol. 5, No. 10, pp. 4040–4056

Fazekas, D. (2010): Carbon Market Implications for new EU Member States. Empirical analysis for Hungary (doctoral thesis). (Szén-dioxid piac az Európai Unió új tagállamaiban. Magyarországi empirikus elemzés). Retrieved from: http://phd.lib.uni-corvinus.hu/415/1/fazekas_dora.pdf

Fischer, C. (2006): Multinational taxation and international emissions trading. *Resource and Energy Economics,* Vol. 28, No. 2, pp. 139–159

Hepburn, C. – Grubb, M. – Neuhoff, K. – Matthes, F. – Tse, M. (2006): Auctioning of EU ETS

phase II allowances: how and why? *Climate Policy*, Vol. 6, No. 1, pp. 137–160

Hines, J. R. (1999): Lessons from behavioral responses to international taxation. *National Tax Journal,* Vol. 52, No. 2, pp. 305–322

Huizinga, H. – Laeven, L. (2008): International profit shifting within multinationals: A multi-country perspective. *Journal of Public Economics,* Vol. 92, No. 5–6, pp. 1164–1182

Karai, E. – Barany, M. (2013): Towards convergence of accounting for emission rights. *Acta Polytechnica Hungarica,* Vol. 10, No. 1, pp. 177–196

Kossoy, A. – Guigon, P. (2012): *State and Trends of the Carbon Market (2012*): Washington D.C.: World Bank

Lise, W. – Sijm, J. – Hobbs, B. F. (2010): The Impact of the EU ETS on Prices, Profits and Emissions in the Power Sector: Simulation Results with the COMPETES EU20 Model. *Environmental and Resource Economics,* Vol. 47, No. 1, pp. 23–44

Lovell, H. – Bebbington, J. – Larrinaga, C. – de Aguiar, T. R. S. (2013): Putting carbon markets into practice: A case study of financial accounting in Europe. *Environment and Planning C: Government and Policy,* Vol. 31, No. 4, pp. 741–757

Lovell, H. – Sales de Aguiar, T. – Bebbington, J. – Larrinaga-Gonzalez, C. et al. (2010): *Accounting for Carbon*. London: Certified Accountants Educational Trust for the Association of Chartered Certified Accountants

Luckhaupt, H. – Overesch, M. – Schreiber, U. (2012): The OECD approach to transfer pricing: A critical assessment and proposal. In: Schön, W. and Konrad, K. A. (Eds.), *Fundamentals of International Transfer Pricing in Law and Economics,* pp. 91–121. Berlin/Heidelberg: Springer

Medina, V. – Pardo, A. (2013): Is the EUA a new asset class? *Quantitative Finance,* Vol. 13, No. 4, pp. 637–653

Neuhoff, K. – Schopp, A. – Boyd, R. – Stelmakh, K. – Vasa, A. (2012): Banking of Surplus Emissions Allowances. Does the Volume Matter? Discussion Papers. DIW Berlin: German Institute for Economic Research

Reizinger-Ducsai, A. (2010): Economic relevancy and accounting mapping of emission rights. *Budapest Management Review,* Vol. 43, No. 3, pp. 52–64

Reizinger-Ducsai, A. (2011a): Managing emission rights in financial reports (doctoral thesis). (Az Emissziós Jogok Kezelése a Pénzügyi Kimutatásokban). Retrieved from: http://www.omikk.bme.hu/collections/phd/Gazdasag_es_Tarsadalomtudomanyi_Kar/2011/Reizingerne_Ducsai_Anita/ertekezes.pdf

Reizinger-Ducsai, A. (2011b): Impact of emission rights on property statuses, income conditions of operating companies. In: Csutora, M. and Kerekes, S. (Eds.), *Accounting for Climate Change – What and How to Measure,* pp. 65–71. Budapest: Aula

Rossing, C. P. (2013): Tax strategy control: The case of transfer pricing tax risk management. *Management Accounting Research,* Vol. 24, No. 2, pp. 175–194

Warwick, P. – Ng, C. (2012): The cost of climate change: How carbon emissions allowances are accounted for amongst European Union companies. *Australian Accounting Review,* Vol. 22, No. 1, pp. 54–67

Wettestad, J. (2014): Rescuing EU emissions trading: Mission impossible? *Global Environmental Politics,* Vol. 14, No. 2, p. 64

Zapletal, F. – Moravcová, E. (2013): Analysis of current conditions within the ETS and its impacts on

firms in the Czech Republic. *Conference on Strategic Management and its Support by Information Systems.* Ostrava: VŠB–Technical University of Ostrava, Faculty of Economics.

Carbon Market Data (2014): Retrieved from: http://www.carbonmarketdata.com

European Commission (2010): Emissions Trading System (EU ETS). Retrieved from: http://ec.europa.eu/clima/policies/ets/index_en.htm

IEA International Energy Agency (2011): *Energy Policies of IEA Countries: Hungary 2011 Review*. Paris: OECD/IEA