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CASH POOLING DETERMINATION AND ITS APPLICATION BY ENTERPRISES DOING BUSINESS IN SLOVAKIA

The article evaluates the level of cash pooling concept knowledge among enterprises in Slovakia and observes the real status of its implementation in practice. Data acquisition has been performed through investigation of Slovak enterprises with respect to their size or sector. Questionnaire was sent to more than 4,000 business entities. The objective was to find out which enterprises, subject to their size and turnover, have implemented cash pooling. As the outcome of real and theoretic frequency comparison, a dependency has been found among the observed variables and thus were able to accept one of the authors' two hypotheses.

Keyword: cash pooling; cash management; Slovak enterprises.

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ОБ'ЄДНАННЯ ГРОШОВИХ КОШТІВ: ВИЗНАЧЕННЯ ТА ЗАСТОСУВАННЯ ПІДПРИЄМСТВАМИ СЛОВАЧЧИНИ

У статті оцінено, наскільки бізнес у Словаччині знайомий з поняттям «об'єднання грошових коштів», а також наскільки словацький бізнес реально користується цим методом. Дані було зібрано та проаналізовано за групами підприємств, розділених за параметрами розміру та галузі. Всього було опитано понад 4 тис. підприємств. Головна мета дослідження – виявити, наскільки розмір підприємства та його оборот впливають на рішення про застосування методу об'єднання грошових коштів. Доведено, що розмір та оборот бізнесу дійсно чинять вплив на таке фінансове рішення.

Ключові слова: об'єднання грошових коштів; управління грошовими коштами; словацькі підприємства.

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ОБЪЕДИНЕНИЕ ДЕНЕЖНЫХ СРЕДСТВ: ОПРЕДЕЛЕНИЕ И ПРИМЕНЕНИЕ ПРЕДПРИЯТИЯМИ СЛОВАКИИ

В статье оценено, насколько бизнес в Словакии знаком с понятием «объединение денежных средств», а также насколько словацкий бизнес реально пользуется этим методом. Данные были собраны и проанализированы по группам предприятий, разделённых по параметрам размера и отрасли. Всего было опрошено более 4 тыс. предприятий. Главная цель исследования – выявить, насколько размер предприятия и его оборот влияют на решение о применении метода объединения денежных средств. Было доказано, что размер и оборот бизнеса действительно влияют на такое финансовое решение.

Ключевые слова: объединение денежных средств; управление денежными средствами; словацкие предприятия.

Introduction. The historical roots of cash management are connected with the US economy in which, during the 1940s relatively big group of banking houses were operating. However, these houses represented an inadequate banking system with low acceleration and flexibility regarding the number of bank operations they realised. Unfavourable world economic development is characterised by J. Belas et al. (2015)

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as "The financial crisis and the gradual recovery of the economies in the European Economic Area brought about a deterioration of the business environment". Financial markets liquidity has been getting worse during the beginning of global financial crisis (Vodova, 2013). In spite of the mentioned facts which menace not only economy of countries but also performance of enterprises, the crisis could not be seen only in its negative aspect. Crisis is leading to the strengthening role and importance of managerial activities at enterprises and it is also an effective tool which could improve economy and liquidity of enterprises. One of such tools could be also cash pooling which contributes to the increasing enterprises' liquidity, thus filling the objectives of cash management.

G. Hohenstein determines cash management as management of liquid assets at an enterprise. An objective of this management is liquidity provision for relatively low price (Hohenstein, 1990). In German literature we can find wider views on cash management. Traditional perception of cash management refers to provision of right amount of money to the right place and right time (Pacakova, 2009). Other definition interprets cash management as a complex of activities from forecasting to management of financial assets the outcome of which is enterprise protection against possible losses (Horcher, 2011). Czech professional literature defines cash management as "management of cash position on accounts and cash-desk" (Reznakova, 2010). Except of these definitions, it is possible to show two levels of cash management understanding. The first level relates to an enterprise itself and the need of its financial assets management. The other one is represented by banks as institutions providing management, monitoring and control over individual enterprises' cash flow (Nitsch and Niebel, 1997). Due to the absence of one clearly determined definition in the area of cash management by Slovak authors, there is a space for our own perception of cash management formulation. To the primary advantages of cash management we could add better prediction of working capital cycle speed forecasting, the ability of maintenance, effective usage of present cash value and acceleration of enterprise activities (Accounting Education). It is important to give proper attention to cash management at enterprises so that to ensure the use of various tools. With respect to the present global trend in cash pooling (CP) application as the tool of cash management the attention must be focused mainly on the explanation of such task. Many foreign companies prepare reports on cash management and application of its elements. In Slovak Republic, there is no relevant information in this area and that is the reason why this research becomes topical.

Cash pooling is a tool of cash management which records increased importance in practical application. This product is less known in our conditions; mainly it comes out from the initiative of bigger foreign enterprises with the subsidies located in Slovak Republic. Determination of cash pooling we do mainly through foreign professional literature. Czech authors determine cash pooling as concentration of financial resources surpluses on one account in combination with current account use (Kislingerova, 2010). According to CFO Best Practice, "cash pooling enables usage of surpluses of one company account on financing of overdraft of another company and by this it decreases necessary external financing in a group" (AFP, 2013). Another definition shows that cash pooling is "usually accomplished through an arranged bank account structure that mimics corporate accounting treatment and offsets cash

deficits with cash surpluses between different legal entities in a corporate group" (Hillman, 2011). In German literature, cash pooling is defined as the "process which should enterprise use through automatic concentration of liquidity on the so-called main account (Master Account) – with the lowest cost and under calculated transport cost – help improve interest return" (Polster, 2004). The key outcome of all these definitions we encounter is joining bank accounts residues to one Master Account. Connection is done regardless of positive or negative bank residues.

In case there is a real transfer of financial resources, we deal with physical CP. If transfer is done on the fictive basis we refer to fictive (notional) CP. Foreign studies usually focus on the areas of these basic types of cash pooling use. "PWC" in its newest published report "Global Treasury Survey" stated that enterprises which employ a lot of financial directors and other competent specialists worldwide deal with the issues of individual techniques of cash management application (PWC, 2014). According to another study of "BearingPoint" for the year 2011 only 23% of enterprises do not incorporate cash pooling strategies, the mostly used types of CP being physical consolidation of residuals (38%). Fictive CP is used at 15% of enterprises, 24% of enterprises implemented both types at the same time (Bearingpoint, 2001).

Data on Slovak Republic are totally missing in similar studies, thus we may presume the situation with enterprises operating in Slovakia. This article shows the actual situation in the selected sample of enterprises in Slovakia and thus contributes to raising awareness about a relatively unknown bank product – cash pooling.

Research design. Data acquisition consisted of a questionnaire investigation distributed through personally or electronically to enterprises in Slovakia with respect to their size or sector. In this part of our questionnaire investigation we wanted to find which enterprises, have implemented cash pooling. We didn't set any particular parameters on the size, sector or other criteria for selection of enterprises. Size representation: all enterprises from micro through small, then medium and large. We disregard natural persons entrepreneurs because banks do not offer cash pooling to these subjects. Due to this reason, these subjects are irrelevant in our research. Questionnaire was sent to approximately 4,000 entrepreneurial subjects (the number was at the level 196,355 at the end of year 2014 which represents an increase of about 7% against the previous year) via a personal contact or in an electronic form (SUSR, 2015). Data collection was done during the period from May to December 2014. The examined sample of the respondents consisted of 338 enterprises. The return of completed questionnaires is relatively low in contrast to the number of the requested enterprises what is in our opinion, was affected not only by low willingness of entrepreneurs to cooperate with such type of research but also by insufficient information provided to them. In this research enterprises are profiled subject to their scale. Because of feedback and other forms of cooperation with the selected enterprises the questionnaire could not be anonymous. We realise that anonymity plays the key role in such cases but also in case of further interest in communication with enterprises, it is necessary to have the names of the companies participating in questionnaire research.

After data collection and relevant information observation, we asked only a small circle of enterprises for the second round in the form of personal meetings or structured questionnaire distribution (the results of this phase of data collection are not

part of this article). Consequently, we did the survey on cash pooling providers in Slovakia through banks' internal data processing, and also through phone contacts and data collection from home pages of the banks.

Methods and research hypotheses. Primary data processing is a necessary precondition for a large scale of scientific methods. Except general methods (analysis, synthesis, induction, deduction, comparison etc.) we are starting mainly from specific methods, meaning mathematic-statistical methods. In the Microsoft Office package, we use the evaluation programme "Excel" and the statistical programme "Statgraphics". Evaluation of contingency (dependency) we are realising through the following calculations, elaborated according to (Pacakova, 2009) the starting point of which is the contingency table providing quantitative two-dimensional display of the investigated elements (Table 1), where $a_1 - a_r$ – the number of individual modifications of factor A (the number of lines); $b_1 - b_s$ – the number of individual modifications of factor B (number of columns); n – the total file scale; for absolute frequency then is valid:

$$\sum_{j=1}^s n_{ij} = n_{i\bullet}, \sum_{i=1}^r n_{ij} = n_{\bullet j}, \sum_{j=1}^s n_{\bullet j} = n, \sum_{i=1}^r n_{i\bullet} = n, \sum_{j=1}^s r \sum_{i=1}^r n_{ij} = n. \quad (1)$$

Table 1. **Contingence table** (Pacakova, 2009)

Factor B \ Factor A	b_1	b_2	...	b_s	Σ
a_1	n_{11}	n_{12}	...	n_{1s}	$n_{1\bullet}$
a_2	n_{21}	n_{22}	...	n_{2s}	$n_{2\bullet}$
...	...	...		...	...
a_r	n_{r1}	n_{r2}	...	n_{rs}	$n_{r\bullet}$
Σ	$n_{\bullet 1}$	$n_{\bullet 2}$	...	$n_{\bullet s}$	n

Having this contingency table and the mathematic modification we are then able to find the dependency among the observed effects. In our case, first we will do Chi-square test (χ^2) recognising the contingency between the size of an enterprise with the dependence to its return (factor A) and implementation of cash pooling (factor B). First, it is inevitable to sum real frequencies O_{ij} (2), there is the same equation done by relation (3), determinants $n_{i\bullet}$ and $n_{\bullet j}$ express the sums of frequencies in individual columns and rows of contingency table.

$$\hat{P} = (A = a_i) = \frac{n_{i\bullet}}{n}; \quad \hat{P} = (B = b_j) = \frac{n_{\bullet j}}{n}; \quad (2)$$

$$\hat{P} = (A = a_i \wedge B = b_j) = \frac{n_{ij}}{n} \times \frac{n_{\bullet j}}{n}. \quad (3)$$

The next step will be counting the theoretic frequency E_{ij} using (4). As the outcome of real and theoretical frequency comparison, we find the dependency among the observed variables (5) and then there could not be a rejection for one of two situations:

- if H_0 is valid, the dependency between A and B does not exist;
- if the H_1 is valid, the dependency between A and B does exist.

$$E_{ij} = n \times \frac{n_{i\bullet}}{n} \times \frac{n_{\bullet j}}{n} = \frac{n_{i\bullet} \times n_{\bullet j}}{n}; \quad (4)$$

$$\chi^2 = \sum_{j=1}^s \sum_{i=1}^r \frac{(O_{ij} - E_{ij})^2}{E_{ij}}. \quad (5)$$

In case the value of Chi-square test exceeds the critical value, we reject zero hypothesis (H_0) and accept H_1 . If the square contingency exceeds the critical value, H_0 could be accepted. Critical value is a necessary count through function in Excel CHISQ.INV ($1 - \alpha$; degree of freedom) where α represents the level of importance defined as "probability of Ist type mistake which we do as rejection of zero hypothesis which is valid in reality. Error of the Ist type represents false rejection of zero hypothesis. Lower values achieve α , then the lower danger of mistake of Ist type could occur. This means we make the conclusion that there is no relation among the variables (Rimarcik, 2007). The mostly used value of this probability is 5%. The degree of freedom is determined by relation $(r - 1) \times (s - 1)$ where r is the number of rows and s is the number of columns in the contingency table. After CHISQ.INV quantification in "Excel", it is possible to compare this value with χ^2 . Consequently, it is possible to determine whether there is any relation among the investigated factors A, B upon validity of H_0 or H_1 .

In case we reject H_0 , we may further study the level of contingency. Literature provides various variants, we decide for two types of calculation – Pearson coefficient of contingency and Cramer coefficient. In case of Pearson coefficient relation (6), values within $<0-0.25>$ stand for weak correlation, $<0.25-0.75>$ – medium strong correction and $<0.75-1>$ – strong dependency. In practice, this coefficient never achieves zero. Average square contingency represents the share in Chi-square test and the size of all file. Cramer coefficient (7) also belongs to the often used coefficients based on square contingency. Its value like in previous two cases could be in the interval from $<0.1>$, where $<0-0.3>$ represents low $<0.3-0.8>$ – middle and $<0.8-1>$ – strong dependency. Cramer coefficient is done by the share of square root of Chi-square test and conjunction of total file elements with the minimum z numbers $(r - 1)$ and $(s - 1)$, e. g. h.

Pearson coefficient of contingency:

$$C = \sqrt{\frac{\phi^2}{1 + \phi^2}} = \sqrt{\frac{\chi^2}{n + \chi^2}}. \quad (6)$$

Cramer coefficient:

$$V = \sqrt{\frac{\chi^2}{n \times h}}. \quad (7)$$

Key results. The question in the structured questionnaire was "Cash pooling as the bank product represents clustering of residuals from bank accounts to one Master account. Have you heard about the concept of cash pooling?". Observations of an information position about given product among individual size groups of enterprises is described in Figure 1.

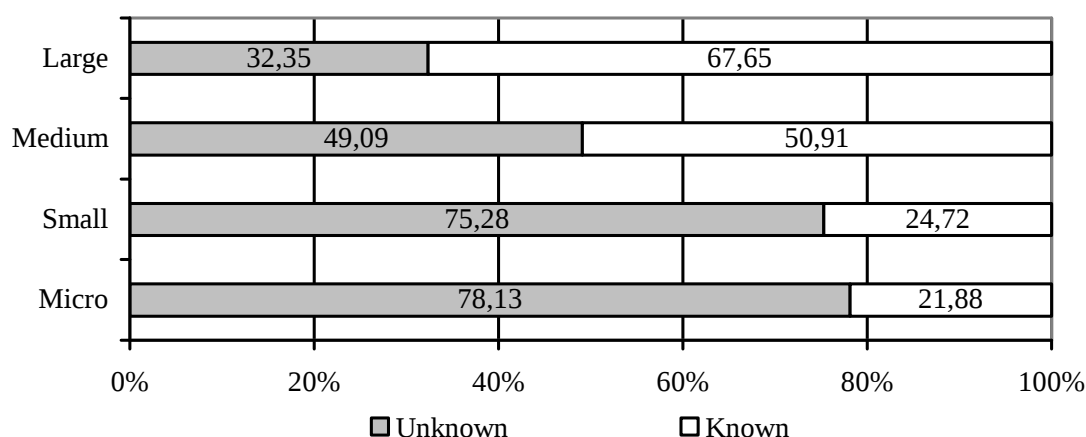


Figure 1. Knowledge of the cash pooling concept by enterprises in relation to their size, authors'

Graphical presentation tells us about the situation in which large companies have sufficient information on cash pooling (67.65% know about this concept against 32.35% that do not know at all). The figure also shows a decrease of information level and increase of information absence in connection with the decrease of enterprise size. The largest share of information absence is seen for microenterprises (78.13%), small enterprises (75.28%) whereas in case of medium enterprises it is almost 50:50. Considering the character of such a bank product it is important mainly in the case of large spectrum of bank accounts with a large amount of transactions. We think this is caused by publicity provided mainly to larger clients. We suppose that cash pooling knowledge is not only a concept but also a possible strategy with potentially higher percentage could be used in case of medium or smaller enterprises for which this product is actually assigned. Low awareness among business entities in Slovakia represents the space for more further intensive application and implementation of innovative techniques now.

With the question "Do you use cash pooling in your company?" we are focusing on determination whether cash pooling is really used in practice. Figure 2 shows the % representation of individual responses. It is evident that majority of enterprises in SR do not implement CP – about 88.17%. Only 9.47% from the total amount of the respondents have integrated cash pooling, in the absolute expression this would be 32 enterprises. Among the respondents, there are also individuals who used to have cash pooling in the past but they have stopped using it because their expectations have not been met. Low percentage could influence also the size representation of the examined sample because the highest representation achieve micro and small enterprises. % representation by types in the total number of 32 enterprises with implemented CP, it is about 81.25% representation of physical consolidation of residuals, and fictive cash pooling is integrated only by 6 companies (18.75%). Neither of the enterprises has mentioned implementing both types of cash pooling. Slovak legislation does not regulate this, there are no limitations in implementation of cash pooling, and the outcome of this is that even it is possible to implement, fictive CP, still, more popular is its physical CP implementation.

This question opens some space for identification of contingency among enterprise size and this automatic tool implementation. Before the relative calculations, we

set up statistically relevant hypothesis that goes out from the determination of the zero hypothesis H_0 and hypothesis H_1 which will be accepted in case of the rejection of the first one.

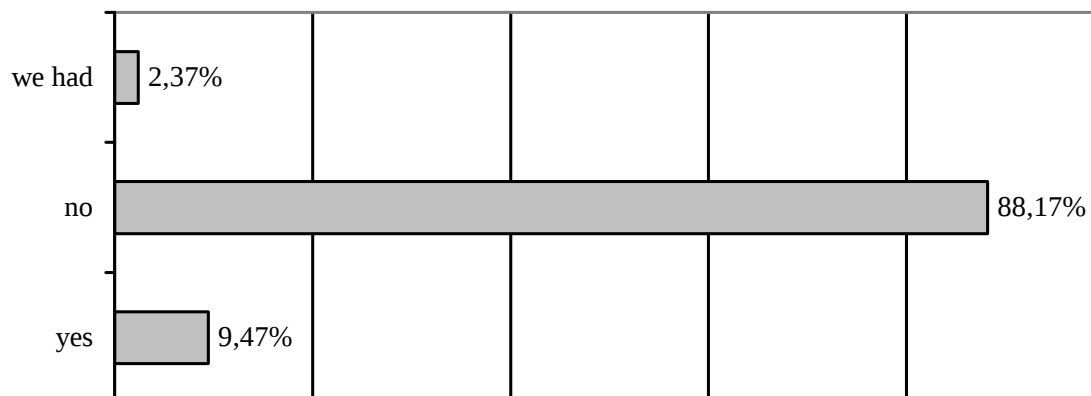


Figure 2. Using cash pooling in practice, authors'

Hypotheses:

H_0 : There is no dependency between enterprise size and cash pooling implementation.

H_1 : There is a dependency between enterprise size and cash pooling implementation.

The first step is frequency counting, see contingency Table 2. We express real frequency for every type of enterprise for both alternatives – "Yes" and "No". We took off the answers when the enterprises used to have cash pooling because due to small real frequency of this answer it is irrelevant for statistical importance and for our investigation. From the total number of enterprises 338 quantification of relative frequency E_{ij} is stemming from (4) which is the part of Table 2.

Table 2. Actual and theoretical frequency of relation between enterprise size and CP implementation, authors'

CP Implementation Size of enterprise	Actual frequency		Theoretical frequency		Together
	No	Yes	No	Yes	
Micro	155	4	143.58	15.42	159
Small	82	5	78.56	8.44	87
Medium	43	9	46.96	5.04	52
Large	18	14	28.90	3.10	32
Together	298	32	298	32	330

In the second part of Table 2 (theoretical frequency) we have to evaluate whether the condition of Chi-square test application is valid, 80% cells > 5 . To this calculation we insert 8 cells from the table whereas only one theoretical frequency is below 5. In case of breach of this condition, there could be distortion, on the other hand, these frequencies are not significant for contingency determination. It is evident that fulfilment of Chi-square test is possible because this condition is fulfilled on 87.5% ($7 / 8 \times 100$).

We will do the counting of Chi-square characteristic after quantification of theoretical frequencies illustrated in Table 3 where we go from relation (5). Particular cells in columns "Yes" and "No" we count as the share of second power of real frequency with its theoretical frequency. After the addition of rows and columns we will have the final Chi-square test marked at the bottom the level of which is relevant for us because of other evaluations.

Table 3. Chi-square characteristics, authors'

CP implementation Size of enterprise	No	Yes	Together
Micro	0.91	8.46	9.36
Small	0.15	1.40	1.55
Medium	0.33	3.11	3.44
Large	4.11	38.27	42.38
Together	5.50	51.23	56.73

Chi-square test is followed by its critical value, we decide for "Excel" function CHISQ.INV ($1 - \alpha$; degree of freedom). As a parameter of the 1st type mistake probability, we input 5%. The degree of freedom according to formula $(r - 1) \times (s - 1)$ will be with respect to the number of rows $r = 4$ and the number of columns $s = 2$ will be after substitution as follows:

$$\text{Degree of freedom} = (4 - 1) \times (2 - 1) = 3.$$

$$\text{Function CHISQ.INV}(0.95;3) = 7.814727903.$$

After quantification of the critical value through function CHISQ.INV which is at the level 7.814727903, it is possible to compare these values and the value of Chi-square test in Table 3. Acceptance of hypothesis we demonstrate in Figure 3. Actual Chi-square characteristic (56.73) is behind the critical value (7.814727903), thus we must reject H_0 and accept H_1 .

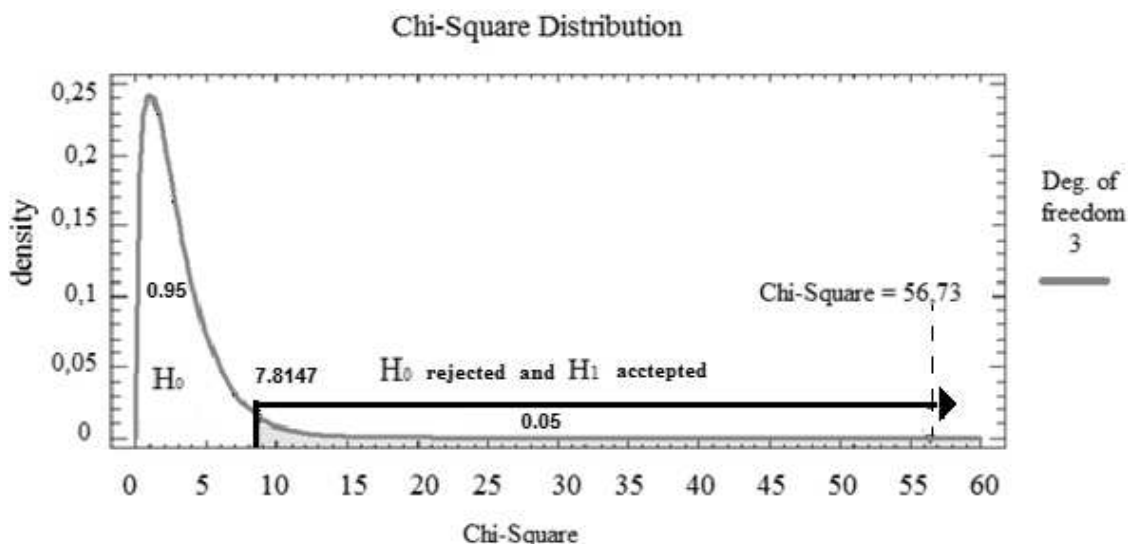


Figure 3. Acceptance of respective hypothesis, from the outcome of in "Statgraphics"

It is possible to observe that between enterprise size and cash pooling use there is high dependency in practice for the enterprises doing business in Slovakia, the power of which we quantify through two relations. Firstly, we use Pearson coefficient of contingency. We go from relation (6) which takes into consideration Chi-square test and the total examined area.

$$C = \sqrt{\frac{56.73}{330 + 56.73}} = 0.3830.$$

Pearson coefficient value of contingency is at the level of 0.3830 which means it is within the interval $<0.25-0.75>$, representing medium strong dependency among the examined factors. Then we applied Cramer coefficient (7) which represents the square root of Chi-square test share and conjunction of total file of examined sample and the minimum of numbers $(r - 1)$ and $(s - 1)$ i.e. h , resp. $\min(4 - 1)$ and $\min(3 - 1)$ is 2.

$$V = \sqrt{\frac{56.73^2}{330 \times 1}} = 0.4146.$$

The final value of Cramer coefficient is in the interval $<0.3-0.8>$ on the level of 0.4146. In this case it is possible to speak about medium strong dependency among the investigated factors. Following the mentioned calculation of coefficients, it is possible say that these results are significant because the mentioned values belong to the medium strong dependency. This means the relation with enterprise size is demonstrated and it is possible say that the more enterprise turnover gets bigger size – the higher is the probability of cash pooling implementation.

The total amount of enterprises which do not have CP is 306, and in the question "If you do not use cash pooling do you think about its application?" we focus on its eventual installation in the future. This question is influenced by not very favourable information and high representation of microenterprises for which cash pooling is not provided as such. 8.82% think about its possible implementation against about 91.18% of enterprises which do not have such plans at all. Among the enterprises which do not have implemented CP, 24.84% are informed about the product and 75.16% do not have any necessary information for its implementation. We think that higher publicity in this area is the primary precondition for potential implementation which could be useful for effective cash management and enables better management of enterprise liquidity, not only of enterprise as whole but also of their individual business units.

Regarding the fact that cash pooling is a specific product provided by bank institutions, there is space for evaluation of how these providers are actually doing business in Slovakia. Summarisation of achieved information is demonstrated in Table 4. Cash pooling represents a product prepared specifically for clients that is the reason why the mentioned types of CP are in portfolio of individual banks only informative, they usually provide and ensure what a client asks for. Almost all banks provide both types of cash pooling, physical and fictive, other types as for example, one-currency and more currencies are part of negotiation with enterprises. Not all banks provide specification of such tools within cash management, but we are persuaded that some research on their implementation by particular banks could be helpful and time saving for entrepreneurial practice.

Table 4. **Cash pooling provision by Slovak banks,**
adjusted according to (Divincova, 2014)

Bank name	Type of CP in the proposal
UniCredit Bank	Physical: - one-way; - bi-directional. Notional: - advantages resulting from CP are put down to every account; - advantages resulting from CP are put down to master account.
ING Bank	Physical (Zero-balancing) } local. Notional } – cross-border.
CSOB	Physical local one-way bi-directional cross-border Notional local one currency more currencies cross-border For financial institutions and large corporate clients are provided both types of CP, for smaller enterprises only notional CP is offered.
Commerzbank	Physical CP (information is not specified)
Sberbank	Physical  Zero-balancing } – one-way Target-balancing } – bi-directional Notional
Citibank	Physical Zero-balancing } – one-way Target-balancing } – bi-directional Notional
Oberbank	Physical (Zero-balancing) } – local Notional } – cross-border Installation one time charge: - interest administration for every service 50 EUR; - all types of CP for every country 300 EUR. Monthly service charge: - main account min 60 EUR depending on a rating - sub-account min 22 EUR depending on a rating.
Komerční banka	Cash pooling provided but information on its types is not specified.
VUB banka	Physical. Notional.
Slovenska sporiteľ'na	Physical CP (zero target balancing): - local; - cross-border in one currency; - one-way; - bi-directional.
Tatra banka	Physical (information is not specified). Notional.

Conclusions and directions for further investigation. Cash pooling has become quite common in cash management, now mainly among foreign enterprises. In the past, it was integrated into operations of large enterprises, but now it is possible to find its implementation at enterprises of smaller size. CP is also applied at enterprises which do not have any subsidiary companies, however having a large number of bank accounts. For Slovak companies this trend is slightly lower. The article evaluates the

level of awareness about cash pooling concept among Slovak enterprises and has showed the real status of cash pooling implementation in practice. Following all of the observed we can state that the level of contingency between enterprise size and CP implementation is relatively strong in Slovak case, however, we also evidence serious gaps in consideration of the number of enterprises which actively employed CP.

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