

Optimization of Capital Transfer Fees Based on the Equality Principle

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Abstract: A cost structure is proposed for improving and measuring the efficiency of the money transferring systems based on the optimization of unwanted transaction fees on a local, national and global scale. The methodology proposed involves business administration and economics theory and employs the previously introduced equality principle and the Efficient Use of Resources for Optimal Production Economy (EUROPE) model. A shift of paradigms is introduced as regards money transferring consisting of the transfer fees in question being regarded as a sort of products that strictly mathematically are treated as the ordinary money flows. The proposed model is generally applicable in the private, corporate and banking capital transfer context. A case study in practice shows the adequacy of the proposed theory by employing fictive but representative figures. It is concluded that the presented methodology is useful for increasing and studying the cost-effectiveness of mainly the occurring fees connected to capital transfer in general. The equity of the distribution of such facilities is improved on all administrative scales. A proposed key figure enables management to immediately obtain an overall comprehension of the economic performance of their capital flow situation that continuously can be reviewed, monitored and evaluated.

Key words: Money transfers • Optimization • Resources • Transaction costs

INTRODUCTION

Capital flows are an integral component of international finance. They allow for savings to be channelled from surplus countries to deficit countries, where returns to investment are typically higher [1]. The financial markets have become more integrated. The flow of capital across national borders without restrictions has been ensured and competitive pressures promoted. Markets and institutions have been inter-linked increasing the speed and the channels of monetary transfer [2]. International capital flows has increased dramatically and motivated policy discussions on the benefits and costs of capital mobility. International capital movements can support long-term growth, but they also pose short-term policy challenges, such as undesirable consequences of exchange-rate appreciation, financial and asset-price cycles and sudden stops in capital flows [3]. Increasing international capital flows lead to better international allocation of saving and investment.

However, they can also make macroeconomic management more difficult because of the faster international transmission of shocks and the increased risks of overheating, credit and asset price boom-and bust cycles and abrupt reversals in capital inflows [4]. Thus, it is important to optimize the capital movements globally in order to make the world economy functioning more efficiently.

The authors successfully has applied the first author's EUROPE model [5] based on the equality principle [6] on, for example, industrial flows and energy flows on mechanical workshops [6], construction [5], ore mining [7], waste management [8, 9] and space economy (unpublished results). In this paper, the intention is to apply the EUROPE model on capital flows as well. Thereby, the ambition is to facilitate the transferring of money on all scales from the single individual via corporations' international payments up to governments transferring capital as a state aid by providing economic incentives to reduce the transfer fees.

The present work is a natural development of the clear ambition of the authors to subsequently cover area after area that the EUROPE model successfully can be applied on. So far, physical matter and energy flows are optimized by the use of the EUROPE model. Here, also immaterial flows such as transferred monetary units, that is to say currency transmissions, are optimized as the foremost feature.

The major objective of the current work is to provide central banks and other major financial institutions with an easy to use and rational tool for short and long term management, monitoring and evaluation of costs belonging to money transferring order to optimize them or at least reduce them. In doing so, the overall ambition is to improve the world economy by generally reduce the existence of transfer fees that globally reduce the efficiency in the money transferring systems for the private individuals' economy, for corporate transfer of money, goods and services between industries and to and from customers also at the governmental level. Thereby, the methodology presented here is generally applicable and hence valid regardless of the very computer-based or other technique used for capital transfer.

The underlying concept to accomplish this is to use fictive shadow costs to burden unwanted money flows and the belonging costs when capital is transferred in order to achieve economic incentives to reduce such adjacent costs. The proposed cost structure is generally useful and hence needs not to be exemplified in detail. Thereby, an easily understood instrument for control and evaluation is obtained because a gradual improvement of the cost situation can be expressed and continuously is monitored by studying the development of the shadow cost for a certain flow or aggregated flows. Such a shadow cost then constitutes a collocating key factor which provides an immediate review of the situation as regards the success of the reduction of unwanted but belonging payment costs and how far away the stipulated, financial target is.

Humphrey *et al.* [10] have made a survey concerning the cost of making/receiving a payment by banks, retailers, and other parties to a transaction. An electronic payment was found to costs between one-third and one half that of a paper-based instrument and a country may save 1% of its GDP annually as it shifts from a fully paper-based to a fully electronic-based payment system. Additional analysis indicated that bank costs of making a payment may have fallen by 45% in Europe as the share of electronic transactions in 12 countries rose from 0.43 to 0.79 over 1987-1999.

Thus, payments are already being conducted in a very cost-effective manner. However, a new tool based on the equality principle to review, monitor and evaluate capital movements is regarded as justified since it enables measuring of the efficiency of the current method of transactions being applied in a certain enterprise. Above all, the EUROPE model in this context constitutes a device for management to momentarily obtain a quick glance comprehension of their apparatus for making and receiving payments.

Other studies somewhat similar to this work have tried to, for example, estimate the transaction costs in stock trading via the implied transaction costs by using option pricing models [11] or examined the effect of fees on a risky assets [12]. Maixé-Altés and Iglesias [13] studies the monetary transfers system of the Spanish economy between 1775 and 1885. The effects of private financial capital inflows in Thailand have been examined by Jansen [14] while Ruback [15] has presented a method for valuing risky cash flows. Virmani [16] has addressed the issue of surge in capital inflows into specifically a relatively open emerging economy. Capital flows are hence rather little studied in terms of money transferring. Thus, the present paper clearly covers a need.

In literature namely there seems not to exist any works performed to as an comprising shadow cost reach at a single key factor that enables a total overview of the capital transferring situation. Thus, the present study represents novel findings of a certain economic potential worldwide.

MATERIALS AND METHODS

In the introduction, the research background and overall objectives are given. Then, the basics of the EUROPE model are outlined to provide the theoretical background of the study. Next is showed how the EUROPE model is adapted to the financial context. Thereafter, the obtained theory is tested in a representative case study with fictive data in order to show the practical usefulness of the developed theory in general terms. The potential end users then get a general framework for how to use the results of the present study in practice. The following discussion section penetrates the peculiarities of the findings whose major benefits finally are summarized in a conclusions' section wherein recommendations are made.

The present study is limited to capital movements of a traditional kind within the established authorities' and banking sector. Thus, the phenomenon of capital flight is not studied despite of being large and growing in some countries [17].

The scientific methodology chosen combines the study of: (a) what kind of money transfer procedures should be changed and how, and; (b) the development of transfer theories and models based on the accumulation of knowledge presented in, in this case, a scientific paper.

A quantitative methodology is mainly applied. However, a qualitative methodology is applied by, for example, conducting interviews with officers at Sveriges Riksbank.

The case study exemplifies the application of the EUROPE model on capital transferring. Thereby the values being used are chosen so to promote an easy comprehension of how the theory can be implemented increased by the usage of general and versatile monetary units.

The validity of the developed methods is evaluated by the application of the commonly accepted traditional concept of cost analysis in an adapted version based on scientific results and long experience of its practical usage. The reliability is ensured by consulting relevant standard works and peer reviewed scientific papers within the area of economics and business economics and related issues.

The Concept of The Europe Model: In this section, the general approach of the EUROPE model is described. Its connection to specifically capital flows is penetrated in section 4. A more sustainable way of looking at the distribution of resources, financial and other, is needed also in the context of transferring money considered by the authors as the quantitative measure of human inter activity. Otherwise, the process of achieving acceptable living conditions may be slowed down due to resources of different kinds being used in a less efficient way than necessary. This improves the equity as well through redistributing the wealth from less efficient actors to those showing a better usage of their available resources due to the shadow costs employed that cause economic incentives to substantially reduce transfer fees.

The shift in paradigms that is argued for here was first proposed by Stenis [6]. It proposes equality in strictly economic terms between traditional products and the wastes stemming from the manufacturing of those products. According to Kuhn's definition [18] this shift indicated by the first author has not yet taken place since transition from one paradigm to another via revolution is the usual developmental pattern of mature science in which the underlying assumptions of the field are re-examined and a new paradigm is established. Nevertheless, the novel concept more precisely involves

equating residuals with regular products in terms of the allocation of revenues and costs. This approach is termed the equality principle [6] and forms the basis for the forthcoming discussion.

The residuals of the different resources studied are regarded as a regular product output which is mathematically considered in Equation (1). This equation is used for the additional allocation of costs and revenues to a certain residual through multiplication by the total costs and revenues in question that are to be allocated by splitting them up in their proper proportions.

$$PF = A / (B + C) \quad (1)$$

where

- PF = The Proportionality Factor that proportionally allocates costs and revenues to A
- A = A certain residual from a certain resource produced ("the bad" to be optimized)
- B = The regular product output (sum of "the goods")
- C = Sum of all the different residual fractions produced (sum of "the bads")

within a suitable production or administrative unit during a certain time period.

Sort: kilogram, litre, Joule or monetary value

Equation (1) represents the economic implications of the equality principle and is termed the model for Efficient Use of Resources for Optimal Production Economy (EUROPE) [5]. When applying Equation (1), a suitable production or administrative unit must be defined, depending on the circumstances.

The PF is multiplied with the total cost mass to get an incentive-improving shadow cost. Thus, shadow prices, or shadow costs, are obtained that induces strong economic incentives to reduce the unwanted residuals which these shadow costs are allocated to. If fully regarded, for example, the financial statements that commercial actors present, such as the profit and loss accounts and the balance sheets, will hence be affected in a way that make the excessive occurrence of residuals and the failure to utilise them productively disadvantageous.

The resulting shadow costs are additionally allocated to the internal economic system of the actor in question in order to force management to improve the performance of their business. This is necessary since otherwise the application of the EUROPE model would mean just a redistribution of resources but no additional burden for

using the input resources in a less efficient way. Then, no economic incentives would occur to really try to improve the poor financial situation due to less efficient usage of the employed resources.

For economic reasons, the production apparatuses will hence be forced to become more efficient. Above all, the ratio of utilising the purchased material and other inputs will improve if the fictive shadow costs that occur when the equality principle is applied are fully considered. Thereby, both the economy, the technology used and the environment will improve due to less residual products of different kinds being produced that can degrade the total performance of the actors in question.

Management hence gets a most versatile tool to simultaneously review, monitor and evaluate the performance of their activities and on-going projects by employing the somewhat generic EUROPE model. The resulting shadow cost can namely be used as a pedagogic key factor that in a quick glance provides an instant flash-light comprehension of the corporate endeavours according to the general principle: the less shadow costs that are allocated to a certain unwanted residual of some kind, the better are the company in question on utilizing their resources due to the reduced existence of that residual. And the more of the purchased input that are transformed into output goods that can be sold on the open market, the higher the profit of that company will be. This, in turn, leads to also a raised technological level due to the increased available resources to make the production apparatus more efficient and results in a cleaner environment as well due to less wastes generally being produced.

Capital Transfer Theory Based on the Equality Principle:

In this section it is shown the general theory for applying the EUROPE model to capital transfers of all kinds. The general idea is to by application of Equation (2) allocate a fictive but incentive-increasing shadow cost (*ISC*) to the generally unwanted fee flow (*A_{fee}*) in proportion to the latter flow's part of the total output from 'the transfer unit black box'. The proposed model copes with several capital flows by application of Equation (3) that can be used to simultaneously optimize *j* different fee flows. By applying Equation (5) the impact of plausible weighing of all the different fee flows in question can be considered when the total shadow cost (*TSC*) of the *n* fee flows is to be optimized.

$$ISC = \text{the incentive-increasing shadow cost} = P_{fee} * TCF = (A_{fee} / (B_{fee} + C_{fee})) * TCF \tag{2}$$

where

- TCF* = The total cash flow cost of the actor in question (total cost mass)
- A_{fee}* = Capital flow fee to be optimized ("the bad residual") Compare Equation (1)
- B_{fee}* = Total amount of all fee-related transfers (sum of "the goods") Compare Equation (1)
- C_{fee}* = Total flow fees related to capital transfers (sum of "the bads") Compare Equation (1)

Sort: Monetary units (MU)

within a suitable production or administrative unit during a certain time period.

TCF encapsulates costs of all kinds connected to handling money for payments from and within the current unit while *C_{fee}* aims at covering the flows related to in particular capital transfers. In other terms, *TCF* encompasses for example salaries for the clerks in question and software costs and the like while *C_{fee}* is delimited to cover the fees restricted to the very transferring activities only. *A_{fee}* here denotes the excessive burdens of all kinds that as an extra cost are levied on the service of transferring capital between a sender and a receiver of any kind. *B_{fee}* refers to all forms of transfers, "the products" that give rise to fees of any kind.

In case of *n* capital flow fees, the total shadow cost can be calculated as follows:

$$\text{The shadow cost (SC) of the } n \text{ flow fees} = SC_{\text{tot } n \text{ flow fees}} = \sum (ISC_j) \tag{3}$$

$$i = 1, 2 \dots j$$

where

$$ISC_j = \text{shadow cost of capital flow fee } j \text{ calculated employing equation (2)} \tag{4}$$

$$j = 1, 2, 3 \dots n$$

Weights (*W*) can be burdening conferred to different capital flow fees of interest according to management's or the current authorities' preferences. *W* is allocated to the fee flow in question in relation to its relative importance compared to the other flows of the same kind within the current system limit and period of time.

In the case of *n* fee flows, the total shadow cost (*TSC*) can be calculated as follows:

$$TSC = \sum (ISC_j * W_j) \tag{5}$$

$i = 1, 2 \dots$ fee flow j

where:

TSC = Total shadow cost of the n fee flows to be optimized

ISC_j = Shadow cost of fee flow j calculated employing Equation (4)

W_j = The weight conferred to fee flow j (sort less)

$W_j \geq 0, j = 1, 2 \dots n$

within a suitable production or administrative unit during a certain time period.

Sort: monetary units (MU)

Equation (5) can be used for management or the authorities to obtain an overall long term comprehension of the successively improvement of a certain financial operation such as a private individual paying a domestic or foreign debt, a company paying a bill to a foreign supplier and/or a government transferring capital as state aid. By applying Equation (5) on the entire set-up of different fee flows at a time, one gets a tool that enables an also short term flash-light review, monitoring and continuous evaluation of the on-going financial transactions. Equation (5) is applicable on all administrative levels from locally to globally. Thus, the proposed model promotes the efficiency of capital transferring by creating economic incentives for reducing extra costs and fees all the way from a single individual putting money on his or her friend's bank account to the state of Sweden giving a tax-subsidized benevolent contribution to the social development in, for example, Eritrea.

Here, the general concept of the EUROPE model is modified by regarding the transfer fee flow to be optimized as "the bad residual" of the generic black box system while "the good products" in this case are the total of the transmitted currency with a connected total of transfer fees that reduce the efficiency of the system. Previously, when applying the EUROPE model a shift of paradigms have been announced based on the upgraded status of the residuals to regular products in an economic sense. As regards money transferring, the shift of paradigms likewise consists of the transfer fees in question being regarded as a sort of products that strictly mathematically are treated as the ordinary money flows. Thus, the new and optimizing way of looking at the transferring of financial resources represents a novelty of this work.

Also, the distribution of financial resources is affected since the proposed methodology is likely to redistribute assets from those actors showing the least efficiency in their financial activities to those being most cost-effective in their money transferring. This is due to the fictive but useful shadow costs employed putting most economic pressure on those actors having the least efficient performance by allocating more shadow costs to these inefficient actors in relative terms. In other terms, more shadow costs are allocated to the unwanted fee flow to optimize, "the bad residual" A , the larger is the A . This procedure also improves the equity globally as well by the reallocation of capital resources that hence takes place.

Case Study: In this section, a generally valid example is shown. Fictive but representative data are employed. The calculation is thought to be performed on an annual basis.

The versatile Monetary Unit (MU) that is used in the case study comprises all kinds of currencies and sizes of transactions performed. Thus, the case equally valid represents a local as well as a global situation without restrictions in scope or scale of capital transfers. Therefore, the case presented in this section shows the applicability of the methodology when private individuals make payments to their friends as well as when whole trade blocs such as the EU or the NAFTA conduct capital transfers to other trade blocs.

$$TCF = 1000 \text{ MU} \tag{6}$$

$$A_{fee} = 10 \text{ MU} \tag{7}$$

$$B_{fee} = 900 \text{ MU} \tag{8}$$

$$C_{fee} = 100 \text{ MU} \tag{9}$$

$$PF = [10 \text{ MU} / (900 \text{ MU} + 100 \text{ MU})] = 1\% \text{ Compare Equation (1)} \tag{10}$$

The voluntarily "profit-reducing" shadow cost to increase the economic incentive to optimize the monetary transfers in question is given by Equation (2).

$$ISC = 1\% * 1000 \text{ MU} = 10 \text{ MU} \text{ Compare Equation (2)(11)}$$

Wherever plausible, 10 MU is intended to additionally burden the relevant profit and loss accounts and balance sheets plus the current budgets and forecasts etcetera. Thereby, the CEO gets a strong

economic incentive to start chasing the production-related causes for the surplus transaction fees that now has increased due to the fictive and purely internal shadow costs being allocated to them provided that the methodology is applied in the corporate context.

DISCUSSION

The present paper shows how the principle of equating residuals with regular products in economic terms can be applied to financial theory with emphasis on capital flows in even a global perspective due to the inherent flexibility of the model to handle capital transfers on different scales up to the level of state and trade bloc budgets. This promising versatility is exemplified in the case study in the previous section since it gives a most reasonable result when comparing the size of the resulting shadow cost (*ISC*) with the size of the total cash flow cost (*TCF*) of the actor in question. This outcome hence provides a mathematically simple and therefore easily understood basis for efficient management of financial transactions related to the management of capital flows.

The overall goal of the study was to investigate the possibility of adapting the proposed methods based on the equality principle as expressed in the summarizing Equation (5) to a financial context characterized by the common wish of the public in general and the major banking and other authorities to make the payment functions of the world work smoothly. The developed methodology is hence suggested to be applicable to any economic activity that involves transaction costs.

The additional incentive-increasing shadow cost will force the actors in question to utilise the financial resources in a more cost-effective way due to the economic incentives that are induced by an unfavourable increase in the final cost mass. The most costly programmes for monetary transfers in relative terms are namely most negatively affected. And the more of the shadow cost that is allocated to a certain capital system, the less cost-effective is that actor's usage of the total resources in relative terms in the long run and the more economic incentive is in the short run imposed on that actor to become more cost-effective and produce less related transfer fees throughout the system in question.

The long run technological level will be raised throughout the current organization due to the economic incentives that stem from the occurring shadow costs. Managers on all levels will namely put pressure on their colleagues responsible for the development of information

technology related to capital transferring to improve the economic efficiency of the banks and other financial institutions' transaction systems. This development will be facilitated by the banks' individual customers putting pressure on primarily the commercial banks to reduce their transaction fees of all kinds. Otherwise the fictive but useful shadow costs will become too substantial when the equality principle hopefully is widely applied by different actors in order to make the different systems for capital transferring functioning more efficiently.

Transaction anomalies which are unavoidably produced can be reduced and utilized in better ways. A substantial contribution can then be made to the ambitions of the central authorities to reduce the transfer costs, the overall goal being improvement of societal welfare.

The general approach of the proposed methodology employs economic theory based on mathematics. That is a strength that makes the application of the model independent of, for example, technological parameters since such factors are expressed in monetary terms.

A weight factor approach is introduced. It is intended to reflect the ambitions of corporate management and relevant legislating authorities related to, for example, environmental policy. In an indirect way, the efficiency of the payment systems of the world has implications for the global environment. Less wasted economic resources namely means more funds available for improving the environmental conditions throughout the entire planet.

However, the major feature of the model is the novel approach for reduction of burdening transaction costs in general and the resulting redistribution of wealth in a global context. More money left for private individuals and other minor transferring parties namely means less money left for the major actors on the global financial arena such as the big commercial banks. Thus, a democratic re-allocation takes place between wealthy and poor actors.

Management obtain a corporate-internal and flexible tool to at the same time optimize, monitor and evaluate the performance of their transactions. This is accomplished by reducing the existence of non-profitable transactions by providing economic incentives to start chasing the currently most costly monetary transfer fee flows in order of declining economic relevance. Continuous study of the development of the overall shadow cost enables the general performance of the current capital transfer project to be followed and instantly obtained through the *TSC* as a general key figure provided by Equation (5).

Further research might concentrate upon how to adapt the presented methodology to specific financial instruments and particularly popular products. Thereby, the employed mathematics of the EUROPE model would be adjusted so to optimize the capital flows connected to those financial products of major interest for the global banking system and the major regulating authorities directed towards the financial sector.

CONCLUSIONS AND RECOMMENDATIONS

The incentives induced by the novel application of the equality principle on capital flows will cause the monetary transfer fees in total to decrease and the business in question will also increase its profit and efficiency since the company's customers obtain more value for their money. Also the overall efficiency of using resources will improve due to less manual and physical resources being used as a result of the economic incentives to increase the efficiency that the occurring shadow costs raise.

Above all, the novel application of the concept [5] enables continuous reviewing, monitoring and evaluation of how well the current actor utilizes the transfer instrument in question so to increase the cost-efficiency of the capital movements. In doing so, decreased shadow costs allocated to unwanted fee flows are an expression for management having become better on transferring capital at a lower cost. In turn, the whole world economy in the long run benefits from the increased efficiency resulting from the EUROPE model based on the equality principle being applied on capital transfers in the way described in this work.

The theory can be applied not only on single enterprises' short term transactions but also on transaction costs within nations, continents and all over the globe. Thus, monetary flows can efficiently be improved and monitored on all administrative levels when the introduced methodology is implemented. The results imply a substantial long term savings potential for monetary transfers within single financial actors' organizations as well as within and between whole nations and continents.

The rationalization potential of the belonging costs of financial transactions is hence very large, also in the global perspective when the actors take the occurring shadow costs for real and use them as a device for measuring the performance of their activities related to management of capital flows. The expected economic

profit resulting from such a simple and rational method as presented here to in general optimize the monetary flows is hence also substantial. Possible major users that can benefit from the findings are, for example, commercial banks, the World Bank, the International Monetary Fund and central banks plus governments' finance ministries. However, the commercial banks are less likely to promote the introduction of the proposed theory on a large scale since they make money on levying different transaction fees on their customers. Therefore, central banks and governments are most likely to adapt the results of this work since these actors mainly want to increase the efficiency of the banking and financial sector.

The over-all conclusions based on the presented findings are as follows:

- The presented research shows a good usefulness when focusing on the cost related aspects of the management of capital flows stemming from monetary transfers;
- The findings will improve the cost-effectiveness throughout the financial sector;
- An improved equity will result due to the democratic ideals being promoted by the findings;
- The proposed economic incentives will lead to a better utilisation of the related resources;
- A certain redistribution of wealth can be expected when implementing the findings.

The main outcome and the major benefits from the present study are as follows:

- Elaboration of a principle for estimation of shadow costs related to capital transactions;
- Implication of cost-saving incentives for the financial sector;
- Reduction of monetary transfer fee flows at the source for all time perspectives;
- Improved environmental quality due to adequate resource management;
- An integrated approach to solve the problem of decreasing the negative impact of transaction fee flows on the financial sector due to the methodology increasing the economic efficiency of the payment systems globally;
- Development of an information support tool for decision-making in capital management at all administrative levels;

- Instant obtainment of an overall comprehension of a project's general performance by study of the proposed key figure in the form of a collocated shadow cost;
- Good usefulness of the theoretical methodology on all kinds of financial transactions;
- Theoretical findings based on well-known business administration and economics theory;
- Good validity and reliability of the theory when implemented on cash management.

Based on the analysis performed, the following recommendations are made. Use the EUROPE model based on the equality principle on:

- The studying of the efficiency of fee flows from capital transaction activities;
- The management of fee flows stemming from capital transactions in general;
- The financial activities related to fee flows transactions of all kinds;
- Projects of all kinds involving monetary transfers in both the short and long run;
- The banking and financial sector involving capital movements influenced by central banks and governments in particular.

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