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TAX SAVINGS NETWORK EQUILIBRIUM

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THEME INTRODUCTION

From 30th July 2002 onwards, people with undeclared money on their accounts in Austria will have a hard time. In Austria it was possible to own anonymous bank accounts, which was a very attractive parking method for undeclared money. But two major factors have influence a change of policies.

First, the political pressure of European Union countries grew since the membership of Austria. There are more EU countries which stricter regulations concerning money laundering, tax havens and tax evasion. Yearly, the tax authorities loose millions of Euros income by non-paid taxes. As all governments are desperately in need for budget funding, they are eager to close existing tax holes and to take measures against tax oasis'.
Second, also the Austria government faces the problem of budget deficits as the actual government tries to reach a zero budget deficit, they are even more eager to catch also the until now untaxed capital assets.[1]

From summer 1996 on, the government implemented laws to identify and declare anonymous share accounts, furthermore stating that the holders of the accounts have to be named. The next step came in October 2000, when the authorities decided to get rid of anonymous saving accounts. From that moment on, with every transaction on or from a savings account, the owner had to identify himself if he hasn't already done so.
But still the are several saving accounts existing, where no transactions have been undertaken since 2000, which therefore did not have to be identified yet.

[1] NOVA Portfolio, „*Der Gläserne Mensch – Harmonisierung der Steuersysteme*", Innsbruck, May 2002, [online: www.novaportfolio.at]

But from the end of next month onwards, banks have the duty to name all bank accounts to the finance ministry. They than have the possibility to identify these accounts by law and officially force them to pay taxes.

Still there is not too much need to worry for investors, if the bank secret would hold. Because this way, their accounts are identified, but the banks are not allowed to tell their identity to the tax authorities. The bank secret, i.e. is very strict in Switzerland, where also no anonymous bank accounts can be opened any longer, but no bank will announce any information of the account holders, even if for example foreign tax authorities try to get the information.

In Austria the bank secret is less strict. Here, the tax authority would be able to break the banks silence by just putting a lawsuit with a judge. With the judges statement the banks are obliged to identify account holders to the authorities.

For a long time Austria refused to break up their anonymous accounts as there exists a permanent competition, where countries try to attract investors capital, with being a good investment place or being a country with tax benefits.

The attracted capital has a large value for the national wealth. In Switzerland for example the financial sector contributes 15 percent to the gross national product (GNP). Furthermore they benefited from the sustainable inflow of capital during the recent decades, as this kept interest rates at approximately 2 percent per annum, which is 50 percent less than the average of other industrial countries.[2]

[2] NOVA Portfolio, 2002

Therefore it is clear that such countries try to resist the new policies, but on the other hand it Union is very powerful in their counter policies, this is why Austria gave up to a certain degree (despite the governments policy for a zero budget deficit).

THE SETTING

In our example we decided to concentrate on the decision procedure of one country, which in our case is Austria. Holders of undeclared money in Austria now have two possibilities to choose from: Either declare their holdings and face huge tax payments or send their money abroad (for example to Switzerland).

Although the money is sent away, in order not to care about the taxation amount, they have to imply the following risks:

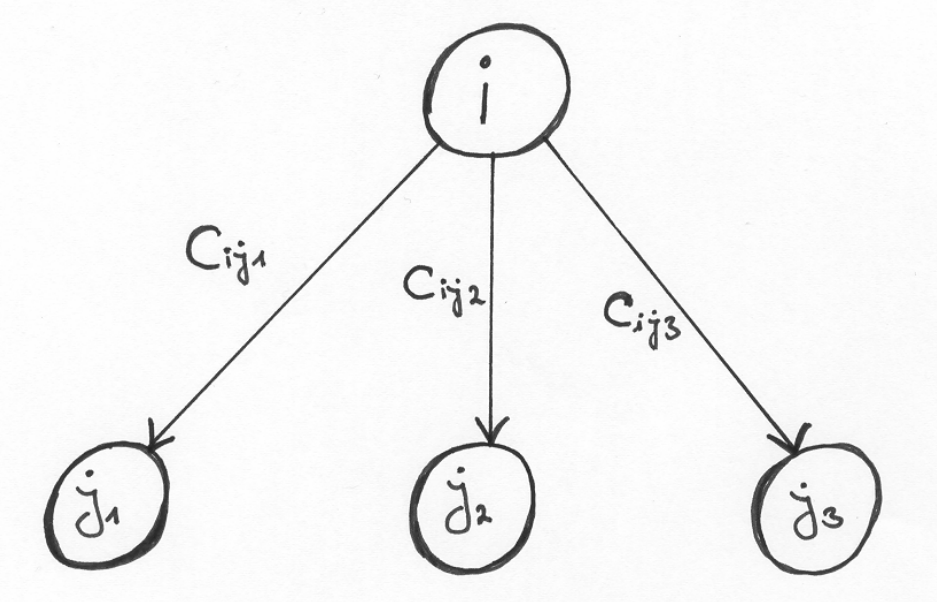
- Being caught by transacting their money
- That foreign authorities notify the investors national authority
- Policy changes in the foreign country which force new actions
- Facing the foreign tax in case the investors have to declare their money in the foreign country but not in their own.

We tried to put this problem into a network structure. The Austrian holders of undeclared money have to decide into which country *j* they want to put their money.

They can choose between leaving it in their own country and hoping that the bank secret will hold or transferring it into an other country with either a more attractive tax rate or more benefiting regulation system. The cost on the links will have to consist of both factors, a factor reflecting the regulation system and a tax rate as a second factor.

The higher the regulation the higher the probability that the investor hast to pay the tax in the foreign country where he parks his money. The given tax rates are the tax rates on capital holdings (e.g. saving books) for different countries. The Austrian holder of the money will be charged the tax if one of the above said regulation events happen. The taxes and the rates of regulation are given in percent rates and they differ from country to country.

The network structure would look like the following:



GRAPHIC 1 – TAX SAVINGS NETWORK EQUILIBRIUM

The nodes represent the different countries. The starting node will be the origin of the money, which can be any country denoted *i.*

In our first example this is only one country, namely Austria, but the model can be extended to show how investors from different countries can optimally channel their undeclared money through the network. The destination nodes are the countries *j*, where the money is finally sent to.

The paths between the nodes respectively the links *i j* represent the decision variables, which are the costs on the links. As stated above the cost for holding undeclared money in a certain country consists of the regulation factor and the local tax rates, which would have to be paid if the investment is declared (in the destination country).

THE LINK COST STRUCTURE:

The cost of the links are a function of the flows, how much money is finally transferred on that specific link. The regulation factor also depends on the amount of inflows, as regulations get stricter the more undeclared money flows in.

This also corresponds to reality, where Switzerland, which had a lot of money inflows in recent years, gets more and more political pressure from the European Union to increase its regulations. The stricter regulations are, the higher becomes the cost for investor to channel money on this link. The link cost function is represented by the following formula,

$$C_{ij}(f_{ij}) = R_j x f_{ij} + t_j$$

whereas R_j denotes the regulations factor and t_j the tax rate in the destination country.

The investors will have to decide on how much money will flow on the link, denoted by f_{ij}.

CONSERVATIONS OF FLOW EQUATIONS:

The sum of the flows on all paths respectively links will be equal to the demand $d_{w.}$ This demand represents the amount of undeclared money available of the specific origin country:

$$d_w = \sum_{p \in pw} * p, \forall w$$

Austrian tax authorities for example estimate the amount of undeclared money held in Austria approximately 3 billion Euro (= ATS 40 billion).

OPTIMAL SOLUTION:

The proposed network will have to be system optimised, as we have to minimize the total cost of the investors flow pattern.

$$Min \sum_j \hat{Cij}(fij) = \sum_j Cij(fij) xfij$$

Therefore the sum of the total cost functions has to be minimized.

PRACTICAL EXAMPLE

We based our example on the countries Switzerland, Germany and Austria. The investor of the undeclared money will have to decide between investing in Switzerland or Germany or leaving its money in Austria.

As tax rates in some countries are structured very complicated and the differences between national taxation systems are hard to be compared, we decided to take the capital tax rates on interest. The capital tax rate on interest, despite some inequalities between countries can be compared much easier than for example income tax rate. The following table is taken from the German ministry of finance (Bundesministerium der Finanzen) and reflects the level of tax rates of October 2001.[3]

[3] BUNDESMINISTERIUM DER FINANZEN, „*Monatsbericht Oktober 2001 – Die wichtigsten Steuern im internationalen Vergleich*“, October 2001, [online: http://www.bundesfinanzministerium.de]

TAX PAYABLE ON INTEREST FROM SAVINGS AT BANKS IN PERCENT		
EU COUNTRIES	Belgium	15
	Denmark	-
	Germany	31,65
	Finland	29
	France	25
	Greece	15
	Ireland	20
	Italiy	12,5 / 27
	Luxembourg	-
	Netherlands	-
	Austria	25
	Portugal	20
	Sweden	30
	Spain	18
	United Kingdom	20
OTHERS	Japan	20
	Canada	-
	Switzerland	35
	United States	-

TABLE 1 – CAPITAL TAX RATES IN DIFFERENT COUNTRIES[4]

The regulation factor, which is influenced by a whole variety of input variables, is very difficult to measure. Although we know that we took an subjective action here, we estimated this figure ourselves. But another question would be, if a whole paper about estimating this factor would reflect more objectivity than the estimation we did.

Our estimation has been influenced by different news articles with the following topics:

- Percentage of public money laundering cases
- Percentage of people caught with undeclared money by the authorities
- Laws against money laundering and tax evasion
- Commitment of banks to the bank secret
- Official policies of countries against taxation crimes
- Political changes

[4] BUNDESMINISTERIUM DER FINANZEN, 2001

and others

The figures for our example will look like the following:

ESTIMATED REGULATION FACTOR	
Austria	12%
Germany	17%
Switzerland	4%

TABLE 2 – ESTIMATED REGULATION FACTORS

CALCULATION OF THE EXAMPLE

3 COUNTRIES - WITH TRANSACTION COST								
Country		Rcij	Tax	Flow	C	C^	C^'	%Flow
Switzerland	CHF	4%	35,00%	25,17	1,357	34,151	2,364	62,92%
Austria	EUR	12%	25,00%	8,81	1,307	11,516	2,364	22,02%
Germany	EUR	17%	31,65%	6,02	1,340	8,069	2,364	15,05%
		Sum of Flows:		40,00		53,74		

TABLE 3 – NETWORK EQUILIBRIUM CALCULATION

To calculate the network optimum, we had to calculate the total cost of the links, denoted by

$$\hat{C}_{ij}(f_{ij}) = C_{ij}(f_{ij}) x f_{ij} = R_j x f_{ij}^2 + t_j f_{ij} .$$

The marginal total cost will have to be equal or minimal in the network equilibrium case. The marginal total cost, denoted by

$$\hat{C}'_{ij}(f_{ij}) = 2R_j x f_{ij} + t_j$$

therefore was equated for all O/D pairs with the general equilibration algorithm, giving the results stated above.

For the numbers we had used, the equilibrium would be if 62,92% of Austrian undeclared money holdings would be transferred to Switzerland, 15,05% to Germany and the rest of 22,02% would await its fate in the home country

POSSIBLE NETWORK MODEL EXTENSION

TRANSACTION COST

Transaction Costs influence every financial transaction that is why it can also be included in our model here. The transaction cost is simply added to the existing cost function.

$$C_{ij}(f_{ij}) = R_j x f_{ij} + t_j + s_{ij}$$

The transaction costs in our example are represented by the currency spread s_{ij}, which is not existing between European countries, but will influence the flow between Swiss Franc and Euro.

3 COUNTRIES - WITH TRANSACTION COST									
Country		Rcij	Tax	Flow	Sij	C	C^	C^'	%Flow
Switzerland	CHF	4%	35,00%	25,15	0,41%	1,360	34,214	2,366	62,88%
Austria	EUR	12%	25,00%	8,82	0,00%	1,308	11,536	2,366	22,05%
Germany	EUR	17%	31,65%	6,03	0,00%	1,341	8,087	2,366	15,07%
		Sum of Flows:		40,00			53,84		

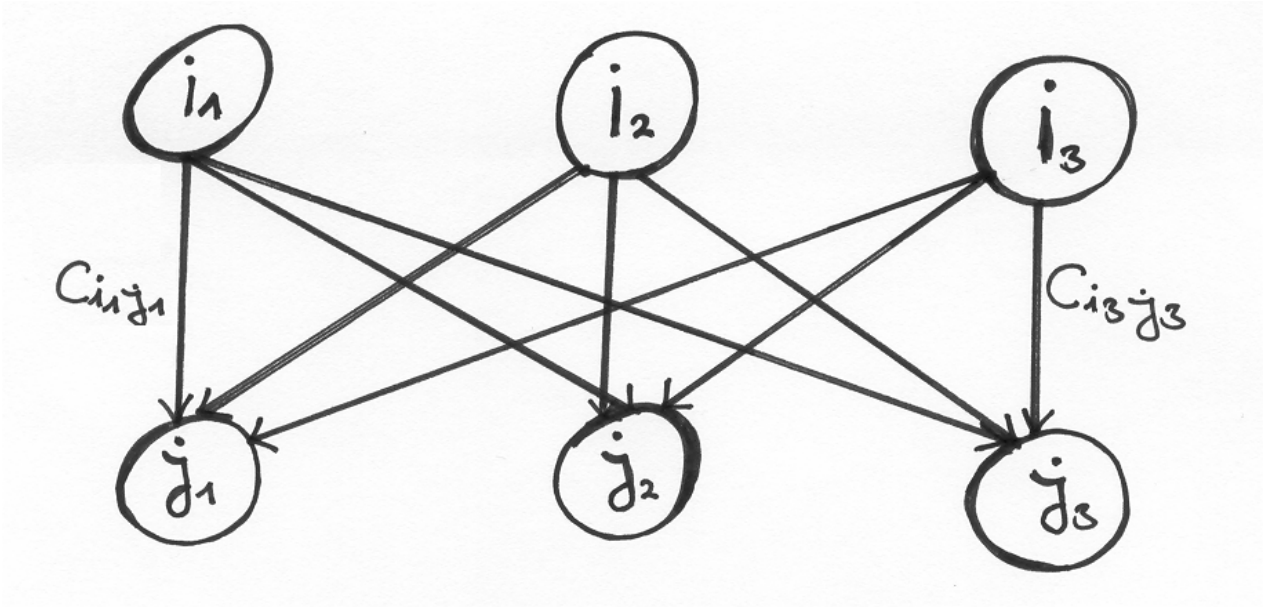
TABLE 4 – NETWORK EQUILIBRIUM CALCULATION WITH TRANSACTION COST

From the calculations it can be seen that the transaction costs between Swiss Franc and Euro had an impact on the flows, but it does not change our numbers significantly.

MULTI COUNTRY MODEL

Our proposed network model can be extended to also multiple origin countries whereas the optimisation process will get more complex but basically will stay the same.

Then the network will look like the following:



GRAPHIC 2 – MULTI COUNTRY TAX SAVINGS NETWORK EQUILIBRIUM

OTHER POSSIBLE EXTENSIONS

The following factors would be interesting to be included:

- Currency risk
- Country preferences
- Social effects
- Interest rates
- Inflation

CONCLUSION

Fact is, that even if political pressure on temporal tax heavens succeeds, there will be other countries which will take the role of low regulation as an attractivity factor in the financial sector.

Furthermore, as it is mainly rich people who have the possibility to evade taxes, these rich people will have more possibilities to either influence politics or maybe even change their residence to a low tax country, for example Monaco.