



EQUIVALENCE BETWEEN TAXATION AND TRADABLE EMISSION PERMITS

Pierre Villa

NON-TECHNICAL SUMMARY

The article deals with the equivalence between taxation and the tradable emission permits according to different points of view. Pollution is a linked production separate from environment, which is a factor, as heat is discharged into the cold source according to energy balances. An economic policy concerning the emission of greenhouse gas for instance is raised because, environment being a public good, the social optimum does not coincide with the market equilibrium. According to Coase there is no need for invoking the government because private agreements were sufficient to rectify bias. It is shown that this is not true, not only because of the usual invoked reasons as transaction costs or multiple equilibria that require to add an additional criterion in order to define the direction of rights and to choose the equilibrium, but also because a market of emissions permits is only feasible when taxation exists previously. In other words taxation comes first, market is second ; taxation is the generating fact, the market of permits is a mode of implementation.

At a firm's level, taxation sets prices, rights set quantities. Equivalence is complete when there is no free emission permits or when they only cover partly the pollution quotas and when they are proportional to effective emissions. The emission permits are thus financial assets with dividends proportional to the discrepancy between the marginal productivity of environment and the cost of the constraint.

At the macroeconomic level the equivalence between emission permits and taxation depends on the rate of profits and is a question of determining the price level of permits, which depends on the scheme of the market.

Two systems are imagined here: first, as in Europe, permits are issued by the government and owned by firms only, second, as for Coase, permits are issued by firms and bought by households or the government. In the two cases, the price of permits is economically determined only under conditions. They must be thought as real option values of costly changes of techniques, because of irreversibility, and as an alternative to the penalty paid when firms overstep the quotas fixed by the government in the European system or to the unit taxes levied on polluting emissions in the Coasian scheme. The two systems are thus equivalent. As changing techniques is costly and irreversible, unit taxes or penalties linked to quotas determine the price of permits. The penalty or the unit taxes are necessary. This leads to propose a temporal order in implementing policy : the initial taxation must be sufficient to engage the

generating fact, it can then be gradually and partly replaced by permits to a certain extent to reduce costs, the value of permits being equal to the penalty multiplied by the probability that the global emissions exceed the norm.

We show that, in the European scheme, only pay-as-bid auctions without free allowances cannot be manipulated. With other types of allocations, Walrasian tatonnement and manipulation allow for dynamics without real economic determination that can be cyclical, ergodic or erratic. It comes from the fact that equilibria are numerous with the same global quotas and because the market of permits is a pseudo market where supply is not independent of demand as the pseudo market of money is. Manipulation arises either from the ex ante allocation of free allowances or from the ex post interventions during the compliance period.

The anteriority of taxation and subvention explains why some countries have chosen equilibria with polluting firms without fixed costs and other equilibria with also firms producing with fixed costs but less polluting simultaneously.

In Europe, where these two types of country coexist, a common taxation or a common market of permits are equivalent but differ from the national tax systems from the Paretian point of view. In that case the cost of subsidies, which are used to finance fixed costs, is not borne by each country but shared among them according to emissions. This cost corresponds to the cost of maintaining no polluting productions with fixed costs and positive common externalities. Free riding by the rest of the world can be avoided by devaluation.

There is an assignment rule. Taxation must be assigned to average emission abatements and permits to marginal ones.

The cost of changing techniques, expounded in the preceding exposition, and the cost of producing raw materials raise the question of the comparative taxes on pollution and energy related to subsidies to the innovation for depolluting, because research and development as the discovery of new natural resources are paid for with rents. Double dividends and the complementarity between energy consumption and pollution are tackled in a growth model, where research and development and primary fossil fuels sectors are characterised by their rents. It is shown that subsidies to innovations must be larger than the taxes on emissions in order to finance the other incomes of the other factors, which are invested in research and development.

These subsidies are necessary in order for the factors to move from industry to the sector of research and development. This movement cannot be spontaneous, because the price that the industry is willing to pay for decreasing pollution is nil when there is no taxation and no more than the taxes on environment. Because taxation of capital and energy induces a substitution between capital and energy, neutrality of taxation is a ternary relation between taxes on pollution, capital and energy.

Limitation of pollution is costly and the benefits are non marketable, but costs can be reduced if innovation rents are not paid when publicly produced.

J.E.L. Classification: E61, E62.

Keywords : equivalence, tradable emission permits, environmental taxation.