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at Member State Level**

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This paper examines the implementation issues and barriers for introducing a carbon tax at EU member state level. Important success determinants are related to the political economy of introducing taxes (negotiations with stakeholders, concessions, changes in proposed legislation, compromises, etc.) which translate i.a. into competitiveness issues, and fairness/equity/distribution issues. For these the design of the carbon tax exemptions, and safeguards to prevent regressivity and the use of the tax proceeds are important. The analysis will focus on the "frontrunner" countries in the EU which have been very successful in terms of the introduction of carbon taxes (Sweden, Denmark and Finland). The countries employed different implementation strategies but underscore the importance of successful issue, timing, linking and to foster political support by safeguarding competitiveness and by addressing income distributions.

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# Introducing carbon taxes at Member State level – Issues and barriers

*Stefan E. Weishaar*

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## **Abstract**

This paper examines the implementation issues and barriers for introducing a carbon tax at EU Member State level. Important success determinants are related to the political economy of introducing taxes (negotiations with stakeholders, concessions, changes in proposed legislation, compromises etc.) which translate inter alia into competitiveness issues, and fairness/equity/distribution issues. For these the design of the carbon tax exemptions, and safeguards to prevent regressivity and the use of the tax proceeds are important. The analysis will focus on the 'frontrunner' countries in the EU which have been very successful in terms of the introduction of carbon taxes (Sweden, Denmark and Finland). The countries employed different implementation strategies but underscore the importance of successful issue, timing, linking and to foster political support by safeguarding competitiveness and by addressing income distributions.

## **Keywords**

Carbon taxes, Climate change

## **JEL codes**

H23 Environmental Taxes and Subsidies

K34 Tax Law

## 1 Introduction

Carbon taxes in Europe are a relatively recent "phenomenon". The introduction of carbon taxes can be subdivided in several phases as described by Andersen (2016). Their first introductions took place in the 1990s in Finland, Sweden, Norway and Denmark. These countries followed the 1988 Toronto Conference on the Changing Atmosphere: Implications for Global Security, a conference that called for the reduction of global CO<sub>2</sub> emissions by 20 percent by the year 2005, the development of a global framework convention to protect the atmosphere, and the establishment of a world atmosphere fund financed in part by a tax on fossil fuels. The carbon taxes that were introduced therefore also coincided with a rising concern for global warming. The motivation for the introduction of this first wave of carbon taxes was, however, also related to the economic situations in these countries (see below).

A second wave of carbon taxes was introduced in Eastern European countries such as Latvia, Slovenia, Estonia and Croatia. Taking place around the year 2000, the introduction of carbon taxes reflected the ambition to limit CO<sub>2</sub> emissions and to prepare for EU accession. Carbon taxes were a source of welcomed additional income during difficult economic times.<sup>1</sup>

A third wave of carbon taxes was enacted around 2010 in Ireland, Portugal and France, all countries experiencing budgetary challenges.<sup>2</sup> The measures were motivated by climate change concerns as well as fiscal ambitions though the revenues were modest in comparison to the countries' deficits. The participation of green parties in government (Ireland) or competition over environmentally minded voters (Portugal, France) eased the political acceptance.

The conditions for introducing carbon taxes differed between countries and over time. Andersen (2016) points out that it has been the 'successful issue linkage' of non-environmental goals such as lowering payroll taxes, EU accession or revenue raising, that has been providing the necessary political leverage for the adoption of carbon taxes. Environmental considerations were thus not the decisive factor. The challenges to be overcome have also been country-specific.

This paper examines the experiences of the front-runner EU countries regarding carbon taxation (Denmark, Finland and Sweden) and addresses the question, which barriers to introducing CO<sub>2</sub> taxes had to be overcome and how they were overcome. Knowledge on this is interesting as the Paris Agreement may lead to the proliferation of carbon taxes (e.g. in the Netherlands)<sup>3</sup> or to the strengthening of existing carbon tax systems.<sup>4</sup>

The approach followed in this paper is inherently multifaceted and takes economic and political aspects into account. It relies on a dual methodological approach employing a

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<sup>1</sup> Andersen (2016).

<sup>2</sup> Andersen (2016).

<sup>3</sup> The Netherlands has recently taking Carbon taxation up into its recent government coalition agreement, see Regeerakkoord (2017).

<sup>4</sup> Switzerland may need to strengthen its carbon tax to realize its climate change ambitions, see Böhringer and Müller (2014).

literature study as well as interviews. Semi-structured interviews were conducted in the last quarter of 2017 with senior civil servants in the respective case study countries who have been selected on the basis of their experience and their knowledge on the carbon tax introduction. Since the implementation of the carbon taxes dates back to the early 1990s there are very few people meeting these criteria. We identified one person in each jurisdiction. The interviews focussed in particular on the political objectives and barriers for implementation of carbon taxes and generally lasted 1.5 to 2 hours. Their insights were especially used in section 6 on policy support.

The paper is structured as follows. Section 2 presents the economic framework prevailing in the 1990s and serves as a background on the introduction of the environmental taxes in Denmark, Finland and Sweden. Section 3 briefly presents the development of the national CO<sub>2</sub> taxes in the case study countries. Subsequent sections address revenue recycling (4), competitiveness concerns (5) and policy support (6). A conclusion will highlight the main findings.

## 2 Economic background

In the Nordic countries (Denmark, Finland, Norway, Iceland and Sweden) a special approach to economic and social policies emerged that is often described as the Nordic model or Nordic capitalism.<sup>5</sup> It is characterised by free markets with a comprehensive welfare state and collective bargaining at national level. It also features a combination of strong individualism and a strong state, high levels of gender equality and social trust.<sup>6</sup> It has been argued that the strong individualism favours a pronounced support for market principles.<sup>7</sup> There is, however, not a single Nordic economic blueprint as the emphasis and approaches towards economic and social policies differ in the case study countries.

### **Denmark**

Denmark joined the (now) European Union in 1973 and adopted a fixed exchange rate regime to address inflation though it has opted-out of the Euro. As of 1982 the Danish Krona was pegged to the Deutsche Mark. This necessitated fiscal austerity measures which in turn led to unemployment. As a consequence labour market rigidities had to be addressed. Expenditure for social transfers rose as welfare standards increased and unemployment soared during the mid-1970s to mid-1990s.<sup>8</sup> In the first half of the 1990s Denmark suffered from an economic crisis with high rates of inflation, large fiscal deficits and high unemployment rates. The low growth period was prolonged by the international recession in 1992. Danish unemployment figures peaked in 1993 at 10.1% when the reform of the labour market compensation system showed effects.<sup>9</sup> In 1993 a new Social Democrat government decided to kick start the economy by means of a moderate fiscal expansion while in 1994 the same government tightened labour market policies. As a

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<sup>5</sup> Eklund (2011).

<sup>6</sup> Berggren and Trägårdh (2011).

<sup>7</sup> Berggren and Trägårdh (2011), p. 14.

<sup>8</sup> Henriksen (2006), p. 11.

<sup>9</sup> Henriksen (2006), p. 12.

consequence Denmark entered into a period of moderate growth with unemployment steadily falling.

### **Finland**

The 1980s were years of high inflation and currency devaluations in Finland. The country had problems in controlling the credit market regulation and suffered from the collapse of the Soviet Union (an important trading partner) in the early 1990s. Unemployment soared and the currency policies had to be changed, leading to tight fiscal policies. Government debt in terms of GDP trebled in the few short years from 1990 to 1993. Under the impression of the political trauma created by the deep recession comprehensive reform programs were implemented in Finland leading to new macroeconomic policies, an independent central bank, strict budgetary rules, deregulation and reductions in the welfare state<sup>10</sup>.

### **Sweden**

The Swedish economy grew very slowly in the 70s and 80s and faced great structural challenges as its competitiveness declined.<sup>11</sup> Taxes rose and the welfare state expanded. The 1980s saw high inflation, currency devaluations and interest rates rose due to fixed exchange rate targets. These in turn led to a banking crisis, a severe economic recession, high unemployment and very high budget deficits.<sup>12</sup> Responses to recessions (subsidization or nationalization) were ineffective and the focus shifted towards opening markets and embracing competition.<sup>13</sup>

By the early 1990s Sweden faced a severe economic crisis and the resulting political trauma facilitated comprehensive reforms to open-up the economy and reduce the regulatory burden. Reforms extended to the tax system, new macroeconomic policies, an independent central bank, strict budgetary rules, deregulation and reductions in the welfare state and specifically the pension scheme<sup>14</sup>. The public debt burden doubled to 80% of GDP during 1990 to 1995.

It can therefore be observed that by the 1990s the successful Nordic economic model came under distress and needed to deal with rising unemployment, competitiveness issues and increasing public debt.

## **3 CO<sub>2</sub> taxation**

### **Denmark**

Denmark introduced a Carbon Tax in the early 1990s. The CO<sub>2</sub> tax was not intended to increase the overall price of energy but to incentivise the consumption of less CO<sub>2</sub>

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<sup>10</sup> Eklund (2011), p. 9.

<sup>11</sup> Steel, pulp and paper, shipbuilding, and mechanical engineering were in distress.

<sup>12</sup> See Fölster and Kreicbergs (2014), p. 5 ff.

<sup>13</sup> Fölster and Kreicbergs (2014), p. 5 ff.

<sup>14</sup> Eklund (2011), p. 9.

intensive energy sources and reflected the increased climate change awareness.<sup>15</sup> It was introduced in multiple phases and part of a larger Environmental Tax Reform. In May 1992 a tax was introduced on energy products consumed by households. The tax was around 13 Euros per ton of CO<sub>2</sub>.<sup>16</sup> Industry that paid the CO<sub>2</sub> tax was refunded during 1992, thereafter businesses had to pay as well.<sup>17</sup> From 1993 to 1995 industries had to pay only 50% of the total CO<sub>2</sub> tax rate.<sup>18</sup> Based on the energy intensity of industries even more generous treatments could be applied reducing the overall tax burden to 10% of the CO<sub>2</sub> tax rate.<sup>19</sup> This system was in force until 1995.

In 1993 the Social Democrat Danish government proposed changes to the carbon tax provisions applicable to the business sector in order to ensure that the country would meet its climate policy target of reducing CO<sub>2</sub> emissions by 20% by 2005 compared to 1988.<sup>20</sup> These changes for the business sector entered into force in 1996. The CO<sub>2</sub> tax applicable was now based on different types of uses. CO<sub>2</sub> taxes were highest for 'Industry space heating' and the 'Household and service sector' and lower for 'Industry light processes' and lowest for 'Industry heavy processes'.<sup>21</sup> Companies could further reduce their tax burden if they signed an energy efficiency agreement with the Danish Energy Agency and invested in energy saving equipment.<sup>22</sup> In 2005 the CO<sub>2</sub> tax was reduced to 12 Euros per ton of CO<sub>2</sub>. The 2009 tax reform emphasized the polluter pays principle and led to increases in energy taxes and CO<sub>2</sub> taxes, e.g. by reducing the threshold in the CO<sub>2</sub> tax for energy-intensive companies in the energy savings tax while at the same time reducing grandfathering under the EU Emissions Trading System.<sup>23</sup> The Economic Growth Plan 2013 saw a reduction on energy taxes used in business processes and the abolition of the energy saving tax (the former CO<sub>2</sub> tax on electricity) and a change in the CO<sub>2</sub> tax on non-biodegradable plastics.<sup>24</sup> In 2017 the Danish carbon tax was 24 EUR per ton of CO<sub>2</sub> equivalent.<sup>25</sup>

### **Finland**

Finland introduced its CO<sub>2</sub> tax in 1990<sup>26</sup> and increased over time to compensate for the reduced fiscal income. It was implemented as an excise duty on energy products. Finland was the first country to introduce a CO<sub>2</sub> tax. The tax was levied on all energy products (light fuel oil, heavy fuel oil, coal, natural gas and peat) except transport fuels as these were already subject to energy taxes.<sup>27</sup> Between 1990 and 1994 the CO<sub>2</sub> tax

<sup>15</sup> Nordic Council of Ministers (2006), p. 64.

<sup>16</sup> Speck (2008), p. 44.

<sup>17</sup> Speck (2007) footnote 11. See also Green Budget Europe and The Danish Ecological Council (2014), p. 3.

<sup>18</sup> Speck (2007), p. 34.

<sup>19</sup> Speck (2008), p. 45. For a detailed description of the tax refund scheme see Speck (2007), p. 34.

<sup>20</sup> Green Budget Europe and The Danish Ecological Council (2014), p. 3.

<sup>21</sup> Speck (2008), p. 46.

<sup>22</sup> Speck (2007), p. 38.

<sup>23</sup> Danish Ministry of Taxation (2009), 10 and Larsen (2011), p. 103.

<sup>24</sup> Det Økologiske Råd.

<sup>25</sup> World Bank, Ecofys and Vivid Economics (2017), p. 14.

<sup>26</sup> Speck (2007), p. 39.

<sup>27</sup> Speck and Jilkova (2009), p. 32.

was only based on the carbon content of the energy product and set at around 1.2 Euros per ton of CO<sub>2</sub>. Subsequently (1994-1996) it was based on the carbon as well as the energy content of the energy product. The weighting started off as 60% carbon content and 40% energy content but subsequently changed to 75% and 25%. In 1997 the CO<sub>2</sub> tax was only based on the carbon content of the energy product again. Between 1996 and 1999 the CO<sub>2</sub> tax was continuously increased from 14 FIM/t to 102 FIM.<sup>28</sup> Over time the tax rate rose and reached 18 Euros per ton of CO<sub>2</sub> in 2003 and 20 Euros in 2008<sup>29</sup> and around 20 Euros in 2010. In 2011 the structure of the energy taxes on fuel for transport and heat and power plants were reformed to better take into account the energy content, carbon dioxide emissions and local/particle emissions.<sup>30</sup> The CO<sub>2</sub> tax is based on the CO<sub>2</sub> emissions of the respective fuel. The weight of levies on carbon dioxide has subsequently been raised.

In 2017 the Finnish carbon tax for liquid transport fuels was 65 EUR and for other fossil fuels at 61 EUR per ton of CO<sub>2</sub>.<sup>31</sup> The Finnish CO<sub>2</sub> tax has thus been changed frequently and often on an ad hoc basis despite the declared intention to have introduced a permanent CO<sub>2</sub> tax system.<sup>32</sup> Initially the Finnish tax was not subject to derogations but these were subsequently introduced for energy intensive companies.

### **Sweden**

In 1991 Sweden enacted a tax on carbon emissions. It was part of a fiscal reform process (Environmental Tax Reform) primarily aimed at shifting the tax burden away from taxes levied on labour and to compensate for the loss in revenues by an increase in environmental taxes<sup>33</sup>. The reduction in income taxes amounted to a 4.6% in GDP in that year and was only partially offset by the proceeds levied via the CO<sub>2</sub> and SO<sub>2</sub> taxes (1.2% of GDP).<sup>34</sup> Energy taxes were lowered to compensate for the introduction of the CO<sub>2</sub> tax. The CO<sub>2</sub> tax is based on the carbon content of the fossil fuel. In 1991 the tax rate was around 43 Euros and increased to approximately 100 Euros per ton in 2007 and to 106 Euros in 2008.<sup>35</sup> In 2017 the Swedish carbon tax rate was 120 Euros per ton of CO<sub>2</sub>.<sup>36</sup>

The CO<sub>2</sub> tax underwent several changes which were at times motivated by competitiveness concerns. As special tax reductions have not been granted to the Swedish industry, this led to an increase in the overall tax burden.<sup>37</sup> Until 1993, industry and households had been charged with the same high energy and CO<sub>2</sub> tax rates<sup>38</sup> but

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<sup>28</sup> Lawn (2009).

<sup>29</sup> Speck Jilkova (2009), p. 33.

<sup>30</sup> IEA (2013b).

<sup>31</sup> World Bank, Ecofys and Vivid Economics (2017), p. 14.

<sup>32</sup> Vehmas (2005), p. 2181.

<sup>33</sup> Speck et al. (2006), p. 194.

<sup>34</sup> Speck (2008), p. 53.

<sup>35</sup> Speck (2008), p. 50.

<sup>36</sup> World Bank, Ecofys and Vivid Economics (2017), p. 14.

<sup>37</sup> Speck et al. (2006).

<sup>38</sup> Speck et al (2006), p. 195.

the energy and CO<sub>2</sub> tax burden was dramatically lowered for industry, agriculture, forestry and fisheries in 1993 in the wake of the economic crisis. From 1993 onwards, these economic sectors were exempt from the energy tax payments and were only subject to a reduced CO<sub>2</sub> tax. Since 1998 the CO<sub>2</sub> tax rates for industry have remained constant in real terms.

The CO<sub>2</sub> tax was reduced for fuels used in installations covered by the EU ETS in reduced in 2008 and abolished in 2011.<sup>39</sup> In 2009 the Swedish government proposed a series of climate and energy measures that were phased in subsequently. The CO<sub>2</sub> tax on natural gas and LPG was increased successively to the full CO<sub>2</sub> tax amount in 2015, and the reimbursement of the CO<sub>2</sub> tax on diesel used in agriculture reduced. The tax rate reduction for industry was increased to 60% of the CO<sub>2</sub> tax and the special provisions on tax reliefs for industrial and horticultural companies phased out.

As presented above the CO<sub>2</sub> tax was first introduced in Finland. While the Finish tax scheme was designed to be revenue raising it only placed a modest cost upon emissions. The CO<sub>2</sub> taxes in Denmark and Sweden were higher but unlike its Finish counter-part quickly included substantial derogation schemes for industry. It is also noticeable that all CO<sub>2</sub> tax schemes were adapted on several occasions.

## 4 Recycling

This section addresses recycling as a facilitator for the introduction of the tax. Because recycling in the area of the carbon tax is tightly linked to the ETR in Denmark and Sweden, recycling is assessed against the backdrop of the ETR.

### **Denmark**

Denmark reduced income taxes and shifted the burden towards environmental tax bases targeting initially the household sector (income tax reductions) as industry was not affected by the 1993 tax reform. The second phase (1996-2000) of the ETR was smaller in magnitude was more directed towards industry: employers' contributions to the labour market pension fund and employer's contributions to the act on labour market funds were reduced and energy efficiency subsidy programs and a special fund for small and medium sized enterprises were set up. The refund scheme was overhauled so that industry would bear the same energy taxes as households. An important feature of this phase is that there was no cross-subsidization between industry and households. In the third phase (1999-2002) environmental taxes<sup>40</sup> and corporate taxes were increased in order to reduce personal taxes and taxes on the yield of pension savings and share yields. The tax burden in this phase was most heavily falling on households as the reform especially increased the energy tax rate where the business sector is largely unaffected.

### **Finland**

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<sup>39</sup> See Hammar and Åkerfeldt (2011), p. 12. The lower level of the CO<sub>2</sub> tax was raised to 30% of the general tax rate for heating fuels used by industry, agriculture, forestry and heat production in CHP plants not covered by the EU ETS.

<sup>40</sup> Speck (2007).

Recycling measures in Finland were only introduced several years after the introduction of the CO<sub>2</sub> tax when in 1998 energy intensive firms could benefit from a tax refund system. Prior to the introduction of the CO<sub>2</sub> tax, a political agreement was reached that the CO<sub>2</sub> tax would be introduced if in return the income taxes would be reduced. Also in the 1996 budget negotiations of the coalition parties the reform of the energy and CO<sub>2</sub> tax system was reached by agreeing on reducing income taxes. The shift from environmental to labour taxes in Finland thereby predates the actual recognition of an ETR as a policy tool. Even though Finland was the first country to introduce a CO<sub>2</sub> tax, it was one of the later countries to embrace this instrument.

### **Sweden**

The 1991 tax reform in Sweden was directed to substantially reduce personal income taxes and partially offset by changes in value added tax and the ETR. The reform was not intended to be revenue neutral. During the years 2001 to 2010 the Swedish tax reform emphasised the lowering of taxes paid by low and medium wage earners and the reduction of social security contributions.

Both Sweden and Denmark were following similar strategies and the CO<sub>2</sub> tax was part of a wider ETR reform. They both recycled money to finance income tax reductions and reductions in the social security payments paid by employers and both did not aim at budget neutrality though Denmark emphasised that there should be no cross-subsidization between households and industry. In Finland the CO<sub>2</sub> tax introduction was associated with reductions in the income tax but did not form part of a wider environmental tax reform framework and did not recycle money to industry until many years after its introduction.

## **5 Competitiveness**

Given the economic situation in the Nordic countries at the time, it is not surprising that competitiveness concerns were high on the policy makers' agenda in Denmark, Sweden and Finland.

### **Denmark**

Competitiveness concerns were important in Denmark. At the introduction of the CO<sub>2</sub> tax the business sector did not pay energy taxes and the CO<sub>2</sub> tax that was introduced in 1992 was fully borne by households.<sup>41</sup> During the years 1993 to 1995 non-energy intensive companies enjoyed a lower CO<sub>2</sub> tax rate (50 DKK instead of 100 DKK) as well as a generous refund scheme that was dependent on the size of the CO<sub>2</sub> tax in relation to the net sales. Under this scheme energy intensive companies were refunded 50% of the CO<sub>2</sub> tax amount paid in excess of 1% of the net sales if the total amount of the CO<sub>2</sub> tax due was equivalent to 1 and 2% of net sales. If the CO<sub>2</sub> tax was between 2 and 3% of net sales the refund was 75% of the amount exceeding 2%. While if the CO<sub>2</sub> tax was above 3% of net sales the refund was 90% of the amount exceeding 3%. This refund scheme reduced the average CO<sub>2</sub> tax burden to 35% of the standard household tax

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<sup>41</sup> Speck (2008), p. 44 and Speck (2007), p. 34, footnote 11.

rate<sup>42</sup> and in effect placed a lower CO<sub>2</sub> tax burden on the manufacturing sector. Moreover, additional support measures were available for up to 3 years if the company paid at least 10.000 DKK in CO<sub>2</sub> tax.<sup>43</sup>

At the time the first phase of the ETR was introduced (around 1994) the Danish government already announced that new environmental taxes would also be introduced for industry. For this an inter-ministerial committee was established which recommended that the CO<sub>2</sub> tax should also be paid by industry, that tax rates should be differentiated according to energy intensity and that tax revenues should be recycled back to industry.<sup>44</sup> These recycling measures took the form of lowering employers' social security contributions (reductions of employers' contribution to worker's pension funds and employer's contribution according to the Act on labour market funds) and investment grants for energy-saving measures. Moreover, a fund for support of SMEs was created. The second phase of the ETR was mainly targeting industry and entered into force in 1996. Safeguarding the adverse effects on Danish competitiveness all money that was levied from businesses would be recycled back to them.

The CO<sub>2</sub> taxes applicable to industry changed in 1995 and companies were obliged to pay the CO<sub>2</sub> tax in accordance with the usage. In case of space heating companies paid the same rates as households while with regard to light processes the tax rate was 50 DKK and increased to 90 DKK in 2000. Heavy processes were subject to a tax rate of 5 DKK which increased to 25 DKK in 2000.<sup>45</sup> Heavy processes were those processes where the tax burden of 50 DKK per tonne of CO<sub>2</sub> permanently exceeded 3% of the value added of the enterprise, while the tax burden at the same time exceeds 1 per cent of the sales.<sup>46</sup> Very substantial CO<sub>2</sub> tax reductions were available for companies that reached an agreement with the Danish government on investing in energy efficiency.<sup>47</sup> The 2009 tax reform led to increases in the CO<sub>2</sub> taxes. The threshold for energy-intensive companies was reduced.<sup>48</sup> The Economic Growth Plan 2013 saw the abolition of the energy saving tax (the former CO<sub>2</sub> tax on electricity) and a change in the CO<sub>2</sub> tax on non-biodegradable plastics.<sup>49</sup>

## **Finland**

The Finnish CO<sub>2</sub> tax scheme did not have any user-specific exemptions during the period 1990-1996 and it is therefore not surprising that the nominal CO<sub>2</sub> tax rates in Finland

<sup>42</sup> Speck (2007), p. 34, footnote 12.

<sup>43</sup> Speck (2008), p. 36.

<sup>44</sup> Speck (2007), p. 36.

<sup>45</sup> Speck (2007), p. 71.

<sup>46</sup> Speck (2007), p. 38.

<sup>47</sup> Light process enjoyed a reduction of around 24% while heavy processes enjoyed initially 40% reduction (in 1996). As the CO<sub>2</sub> tax was raised from 5 DKK in 1996 through the years to 25 DKK per ton of CO<sub>2</sub> in 2000, also the percentage of the reduced tax rate increased to 88% because the tax rate for heavy process under the government agreement remained fixed at 3 DDK per ton of CO<sub>2</sub>. See Speck (2007), table A4-1c; and see also Nordic Council of Ministers (2006), p. 64.

<sup>48</sup> Danish Ministry of Taxation (2009), 10 and Larsen (2011), p. 103.

<sup>49</sup> Det Økologiske Råd.

were low by international standards.<sup>50</sup> During the period 1994-1996, when the CO<sub>2</sub> tax was combined with the energy tax, there was a lowered tax rate on natural gas and no CO<sub>2</sub> component was levied on peat motivated by energy and regional policy considerations.<sup>51</sup> Competitiveness considerations in the power sector and manufacturing were always high on the policy agenda.

Between 1994 and 1996 the CO<sub>2</sub> tax was based on the carbon as well as the energy content of the energy product but in 1997 this changed again to a 100% CO<sub>2</sub> tax. This change was directly initiated on the basis of criticism by electricity producers and large energy users.<sup>52</sup> The business environment of energy-intensive industries and electricity producers changed as Finland prepared for the 1995 EU accession, electricity market reform and rising energy taxes – as a consequence industry was concerned about international competitiveness and questioned the environmental effectiveness of the energy and carbon tax regime in a common Nordic energy market.<sup>53</sup> Even though Finland had the lowest energy taxes in the Nordic countries, the tax on fuels for heat production was changed to a full CO<sub>2</sub> tax, the electricity tax was changed from a production to a consumption orientation, i.e. instead of being levied on electricity generation it is now levied on electricity consumption, and a tax refund system was implemented in 1998 for energy intensive industries. Under this refund scheme 85% of the amount paid in CO<sub>2</sub> tax and electricity taxes exceeding 50,000 Euros can be refunded provided that the total tax burden exceeds 3.7% of the production value added.<sup>54</sup>

### **Sweden**

The carbon tax and the energy tax are closely linked and have to be assessed jointly<sup>55</sup> when addressing competitiveness issues. Initially, the Swedish CO<sub>2</sub> tax did not provide for derogations for industry but increasing tax burdens led to competitiveness concerns as industry and households paid the same energy and CO<sub>2</sub> tax rates. Therefore, the total energy tax burden of companies was capped at 1.7% of the sales value until the end of 1991 and as of 1992 it was reduced to 1.2%.<sup>56</sup> According to Sterner (1994) this meant that year on year individual firms had to apply to the tax authorities that was impractical, expensive and subject to criticism (nepotism and corruption) and potentially subject to challenges under e.g. WTO law.<sup>57</sup>

This system was reformed and the Swedish manufacturing industry was exempt from paying energy taxes as of 1993 and subject to reduced CO<sub>2</sub> tax rates.<sup>58</sup> In the years 1993-1997 it was 25% of the CO<sub>2</sub> tax rate, 50% during 1998-2000 and subsequently

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<sup>50</sup> Vehmas (2005), p. 2180.

<sup>51</sup> Vehmas (2005), pp. 2177-2178.

<sup>52</sup> Vehmas (2002).

<sup>53</sup> Vehmas (2002), p. 250.

<sup>54</sup> Vehmas (2005), p. 2177 and Sairinen (2012), p. 431, footnote 4.

<sup>55</sup> Johansson (2006), p. 2 and Hammar and Åkerfeldt (2011).

<sup>56</sup> Speck (2007), section 4.6.2.

<sup>57</sup> Sterner (1994), p. 22. On this point see also Hammar and Åkerfeldt (2011), p. 5.

<sup>58</sup> Hammar and Åkerfeldt (2011), p. 5.

reduced towards 21% in 2005 (in 2001: 35%, 2002: 30, 2003: 25%, 2004: 21%, 2005: 21%). This helped to limit the overall tax burden (comprising energy and CO<sub>2</sub> taxes) for the Swedish manufacturing sector.

Energy intensive companies benefited from a refund on their CO<sub>2</sub> tax if the tax due exceeds 0.8% of the value of sales. In this case companies paid a reduced percentage amount over the excess tax burden. Energy intensive companies whose carbon tax bill exceeds 1.2 percent of the sales value are exempt from paying any tax on the excess amount.<sup>59</sup>

The impact on the business sector has to be seen in the context of the ETR that also encompassed taxes on tap water, wastewater, plastic and paper bags.

In comparison to the comprehensive Danish tax exemption scheme on energy, the Swedish scheme appears to be more transparent and is less elaborate in the sense that it gives industry fewer possibilities to avoid paying excise duties on energy consumption. Implementation also appears to very simple and cheap in Sweden.<sup>60</sup> There are simply fewer exception options in the Swedish legislation. Moreover, the Swedish scheme for energy excise duties is predominantly based on the CO<sub>2</sub> tax whereas the Danish scheme is oriented towards the energy tax. The tax design in Sweden places a higher tax burden on fossil fuel energy consumption by Swedish industry compared with Danish industry. Finland by contrast has for long avoided the support for industry and addressed competitiveness concerns by having a comparably low CO<sub>2</sub> tax level. Only as of 1998 were derogations for energy intensive industries introduced, though particular energy sources such as peat and natural gas were enjoying a lower tax burden.

## 6 Policy support

This section examines the implementation of the policy dimension of introducing CO<sub>2</sub> taxes. This section focuses in particular on the political objectives and barriers for implementation of carbon taxes and is predominantly based on semi-structured interviews.

### **Denmark**

The implementation of the CO<sub>2</sub> tax in Denmark was made possible by a balancing of diverse interests of different groups of society. At the time of introducing the tax the centre party was in favour of taking climate change measures while this was not a policy priority for the two conservative parties. The political support for introducing the CO<sub>2</sub> tax was granted by the Social democrats by earmarking parts of the tax proceeds for improvements in the Danish district heating system. The improvement and expansion of district heating was also an important element for gaining support of the unions as this promised not only employment opportunities for workers but also for union officials.

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<sup>59</sup> Speck (2007), section 4.6.2. These measures were made more strict in 2011 and to be phased out by 2015 see Hammar and Åkerfeldt (2011), p. 15.

<sup>60</sup> See Hammar and Åkerfeldt (2011), p. 8.

Another explanation for the political support is that a CO<sub>2</sub> tax favoured the investments that had been made in the natural gas market. Due to the oil crisis energy prices had been very high in Denmark and the political decision was taken to reduce the nation's dependency on oil. As oil prices declined, however, by the mid-1980s the (industrial) policy case for the decision to invest in gas appeared to be less compelling. Policy makers as well as utilities could find themselves in supporting gas.

When introducing the CO<sub>2</sub> tax competitiveness concerns were an important point of consideration. Companies appeared at times to publicly welcome the CO<sub>2</sub> tax while requesting the trade associations to take a strong position against it. The public sentiment was becoming more environmentally minded and enterprises liked to be associated with responsible environmental conduct. A way to overcome this obstacle was setting up a generous refund scheme that allowed companies to pay a reduced amount of CO<sub>2</sub> tax rates. The system was in effect placing a lower CO<sub>2</sub> tax burden on the manufacturing sector.

The support scheme for energy intensive (heavy process) companies was politically challenging to design given the high degree of technological diversity in the Danish industry. The solution to focus on the value added of the enterprise constituted a limited administrative burden for companies as this information was already relied upon in other fiscal contexts. An important element to gain support and make the CO<sub>2</sub> tax feasible may also be found in creating the possibility to have agreements between companies and the government regarding energy efficiency improvements. Such agreements placed energy efficiency on the agenda of management and required management to pay more attention to their engineers.

Households were shouldering the predominant burden of the CO<sub>2</sub> tax. The introduction of the CO<sub>2</sub> tax was partly offset via a reduction in the existing energy taxes that as such did not affect industry.<sup>61</sup> Positions of households may have been co-determined by the wider context of the Danish ETR which was intended<sup>62</sup> to be a revenue neutral tax shift program and led to reductions in income taxes.

### **Finland**

Finland is a sparsely populated country with long transport distances and an energy intensive manufacturing industry in the area of forest and paper.<sup>63</sup> It therefore took special circumstances to introduce a CO<sub>2</sub> tax that would place costs upon industry. At a time when environmental concerns were becoming more prominent and the economy was growing, the Finnish government did not want to give the political opposition parties an asset for the next elections and therefore were willing to strike a deal with the Greens to introduce environmental taxes in exchange for income tax cuts.

The change of the CO<sub>2</sub> tax to base it to 25% on energy content of the primary energy source and 75% on the carbon content was made to take away the fiscal advantage the pure carbon tax system placed on nuclear power and imported energy. Peat as a

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<sup>61</sup> Speck (2007), p. 34.

<sup>62</sup> Speck (2007), p. 35.

<sup>63</sup> This section is based on Sairinen (2012), p. 426 ff.

domestic energy source should be exempt from the CO<sub>2</sub> tax to support regional and employment policy as well as for energy security reasons.

The government remained under pressure regarding its CO<sub>2</sub> and energy tax. The 75/25 CO<sub>2</sub> tax remained subject to opposition as industry favoured an energy tax that was not based on the carbon content and the European Commission criticised the Finnish energy tax that put a levy on energy imports from other Member States in the newly liberated Nordic electricity market. As the biggest power company in Finland lost clients as Danish coal power imports increased, the pressure on the CO<sub>2</sub> tax mounted. As a consequence, over time a complex compromise arose in which a series of measures were taken: the energy tax was reoriented towards an electricity consumption tax, income taxes were lowered while the electricity taxes for households (not industry) were raised and the carbon tax was removed from electricity production while heat production was taxed according to its carbon content. Moreover, energy intensive companies could now benefit from a tax refund scheme.

### **Sweden**

The Swedish CO<sub>2</sub> tax was introduced at a point in time when environmental concerns were high on the social and policy agendas.<sup>64</sup> The Environmental Tax Commission was set up in 1987 to analyse the possible introduction of environmental taxes in Sweden.<sup>65</sup> The Environmental Tax Commission was based on a broad involvement of stakeholders including politicians, bureaucrats, and various interest groups and underwent a public hearing and proposed various environmental taxes including on CO<sub>2</sub>, NO<sub>x</sub> and SO<sub>2</sub>.

It was, however, not only the environmental mindedness of the Swedish that paved the way to the implementation of an ETR. In the late 1980s the Swedish economy was in distress and in part due to the combination of inflation and tax schedules being denominated in nominal currency middle income earners found themselves paying marginal income tax rates that were intended for the very rich (80% marginal income taxes). As a consequence, the reduction of the income tax became a policy priority and in order to reduce budget deficit increases new tax bases needed to be identified: environmental taxes such as the CO<sub>2</sub> tax were an obvious way forward.<sup>66</sup>

Fearing negative effects on competitiveness, Swedish industrial organizations opposed the CO<sub>2</sub> tax. While initially introduced without discriminating between industry and households, this changed in January 1993 when industry was exempted from all energy taxes and only had to pay 25% of the CO<sub>2</sub> tax.

A benefit that the Swedish industry – and Swedish administration – enjoyed is the administrative simplicity of the introduced tax regime that has done away with the complicated application of energy tax concessions under the pre-1993 energy tax regime.

In the case study countries similar challenges for mustering policy support for implementing CO<sub>2</sub> taxes have been encountered. The approaches to address these bear

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<sup>64</sup> Hammar and Åkerfeldt (2011).

<sup>65</sup> Sterner (1994).

<sup>66</sup> This passage follows Sterner (1994).

some similarities. In all countries, albeit to a varying degree, there was concern about the high income tax which was either traded in a political bargaining in return for introducing a CO<sub>2</sub> tax (in the case of Finland) or where the CO<sub>2</sub> tax was used to raise funds to finance an income tax reduction (Denmark and Sweden). Income tax reduction paired with a generally heightened concern for the environment in all countries created the basis for support from households.

Industry appeared to be resisting the implementation of CO<sub>2</sub> taxes and successfully helped to shape derogation policies. These came in the form of reductions in social security contributions, energy efficiency schemes and special provisions for energy intensive industries. In all countries the brunt of the CO<sub>2</sub> tax burden is borne by households. In Finland where fewer derogations exist it is noticeable that the CO<sub>2</sub> tax level is generally lower than in Denmark or Sweden. Besides these points also administrative simplicity was regarded as a positive element in the implementation of CO<sub>2</sub> taxes. This took the form of relying on existing tax forms or procedures or by collecting relevant information for taxation at a limited number of installations.

Other policy considerations have been playing a role for creating support for the implementation of a CO<sub>2</sub> tax. In Denmark it was the earmarking of funds for the district heating system and the desire to support the natural gas market (industrial policy) that helped the implementation. In Finland it was the pre-election expedience not to allow the opposition party to claim this policy field that aided the introduction of the tax.

## 7 Concluding remarks

There have been important barriers and success factors which enabled the introduction of the CO<sub>2</sub> taxes in the case study countries. The treatment above has shown that similar impediments have been at play in all three countries. These impediments relate to revenue recycling, competitiveness issues and the challenge to muster political support for the introduction of the CO<sub>2</sub> tax. The delineation between these elements is not always clear cut and often there is a close interrelation between them. 'Issue linking' to strike a balance between different interests has been of paramount importance in all countries. Recycling money back to industry can improve companies' competitive position and hence appease them and foster political support or at least lead to less resistance.

The experience of the case study countries shows that the introduction of the CO<sub>2</sub> taxes was possible by employing a consensus approach. In the case of Sweden and Denmark the CO<sub>2</sub> tax introduction was driven by a wider policy framework, while in Finland it initially was a political agreement between the government and the opposition. In all countries the political resilience of the CO<sub>2</sub> taxes was ensured by frequent adaptations of either the CO<sub>2</sub> tax or its wider framework, the ETR. The consensus approach underlines the importance of recycling in order to mitigate regressive effects on income distribution in the policy design and the need to safeguard competitiveness. Both issues are tightly related as they can be used to gain stakeholders' support – though this should not go as far as to significantly reduce the environmental impact of the measure, as was the case

in Norway (on Norway see text box).<sup>67</sup> In the case study countries households received inter alia income tax reductions but were bearing a bigger share of the tax burden while companies were at least in part able to receive tax exemptions or tax refunds. Notably in Denmark cross-subsidization between households and companies was avoided. This is also a successful approach that has been followed by Switzerland which recycles CO<sub>2</sub> tax proceeds back to residents via reductions in the health care insurance premium (see the text box on Switzerland).

In the case study countries companies also benefited from energy efficiency schemes that were designed to help them reduce production costs. Finland is a special case in this regard as for long it did not have such derogations and the Finish CO<sub>2</sub> tax did also not benefit from flanking support of an ETR that could offer additional possibilities to support stakeholders. Perhaps this is why the Finish tax started relatively low tax rates and only increased as provisions favouring industry (e.g. in the energy domain) extended.

It appears that industry was strongly considered and regarded as an important stakeholder while households were playing a lesser role. Perhaps this can be explained by pointing towards collective action problems that hinder households to undertake action or the acceptance of the environmental goals as a policy justification.<sup>68</sup>

Perhaps as important as overcoming the barriers for introducing a CO<sub>2</sub> tax is to have a favourable policy environment for introducing it. All countries had experienced a significant degree of economic strife and used this impetus for fiscal reforms or to unlock different funding sources. Arguably one lesson to be learned is not to waste a good crisis.

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<sup>67</sup> Bruvoll and Larsen (2004).

<sup>68</sup> Buchanan (1987).

### **Swiss CO<sub>2</sub> fee**

The Swiss CO<sub>2</sub> fee is special because it is a pure steering tax and is redistributed back to the population and the business sector. The Swiss CO<sub>2</sub> fee entered into force on 1 January 2008 and is levied on fossil fuels (heating oil, natural gas, coal, petroleum coke and other fossil combustibles) that are used to generate heat, produce electricity in thermal plants or operate combined heat and power (CHP) plants. The expected non-compliance with the targets of the 1999 CO<sub>2</sub> Act led to the 2005 proposal to introduce a CO<sub>2</sub> fee.<sup>1</sup> Political controversy had forced the Federal Council to treat heating and motor fuels differently.<sup>1</sup> The introduction of the 'Klimarappen' on motor fuels was a voluntary commitment by Swiss industry to avoid a fee on motor fuels. The CO<sub>2</sub> on heating until 2008 and was eventually introduced at 12 CHF per t-CO<sub>2</sub> and increased over time. After a government review found that Switzerland's GHG emissions were higher than the targeted levels for 2016, on January 1, 2018 the CO<sub>2</sub> fee was increased from CHF84/tCO<sub>2</sub>e (US\$87/tCO<sub>2</sub>e) to CHF96/tCO<sub>2</sub>e (US\$99/tCO<sub>2</sub>e).<sup>1</sup> The CO<sub>2</sub> Act 2021-2030 is presently under total revision.<sup>1</sup> The legislative drafts envisage a strengthening of the emission reductions to reduce Swiss emissions to 50% below 1990 levels by 2030.<sup>1</sup>

### **Competitiveness**

The Swiss CO<sub>2</sub> fee is a steering fee and proportionally transferred back to the business sector. If the business sector burden is 60% of the fee, then 60% of the tax proceeds are distributed back to them. It is therefore revenue neutral and there is no cross-subsidization between individuals and companies.

Emission intensive companies can apply for exemption from the CO<sub>2</sub> fee if they conclude a voluntary target agreement for reducing emissions with the competent authorities. Emission intensive companies with an installed capacity of 10 to 20 MW can be freed from the CO<sub>2</sub> fee if they voluntarily enter the Swiss ETS. Larger companies with an installed capacity above 20 MW fall under the Swiss ETS and are exempt from the CO<sub>2</sub> fee.

The 2013 revision of the CO<sub>2</sub> Act saw a further developed of the Swiss ETS and particular attention was placed in the design to a future link between the Swiss and the EU ETS.

### **Recycling**

The CO<sub>2</sub> fee is a steering fee and redistributed back to the population and the business sector and is therefore revenue neutral. The proceeds (minus administrative costs) are redistributed back on proportional terms to the population and to businesses which have been paying the fee. Those businesses that have opted to take part in the Swiss ETS are thus not receiving money.

The money is distributed via the Federal Old Age and Survivors' Insurance fund on the basis of the company's total payroll expenses. Residents receive money via health insurance companies and a deduction of their insurance premium. About 1/3 of the revenue is earmarked for a program on climate-friendly building renovations, the use of renewable energies, the utilization of waste heat, and building engineering.<sup>1</sup>

### **Norwegian CO<sub>2</sub> tax**

The CO<sub>2</sub> taxes in Norway were introduced in 1991. The taxes on onshore are generally levied on the purchase or import of mineral oils and petrol. The CO<sub>2</sub> taxes on the offshore sector are levied on the burning of petroleum and natural gas.<sup>1</sup> CO<sub>2</sub> taxes in Norway differ considerably between sectors, fossil commodity sources and usage. The average tax rate varies between sectors the relative use of different fossil commodities and whether the sectors use the commodities for stationary, mobile or process purposes.<sup>1</sup> The CO<sub>2</sub> tax in Norway has been increased in 2013 and again in 2016. The carbon tax increased again in 2017 to US\$60/tCO<sub>2</sub>e for mineral oils, petrol, diesel, hydrofluorocarbon and perfluorocarbon emissions.<sup>1</sup>

### **Competitiveness**

Competitiveness concerns have been an important factor in shaping the tax rates and exemptions in Norway. The Norwegian CO<sub>2</sub> taxes are dominated by high taxes on emissions from the oil industry and transport.<sup>1</sup> Industries metal producing process industries are partly or totally exempted from the carbon tax. Process emissions and emissions from the use of coal and coke<sup>1</sup> for producing ferroalloy, carbide and aluminium are exempted. Exemptions are also available for fishing in distant and coastal waters<sup>1</sup>, air and ocean transport, manufacturing of cement and leca and land-based use of gas, pulp and paper and herring flour. Emissions from industrial processes are not covered. The wood processing industry, herring meal and fishmeal enjoy a 50% reduction of the tax level. Moreover all use of gas on the main land was exempted in 2006 while the use of gas from activities within the petroleum sector on the continental shelf was taxed.<sup>1</sup> The petroleum producing sector is quite important in Norway and carries both a high climate policy burden as the carbon taxes on oil and natural gases extraction are comparatively high.<sup>1</sup> The carbon tax is considered a tax deductible operating cost for the petroleum production and which alleviates the fiscal burden to companies.<sup>1</sup> Installations falling under the EU ETS are exempt from the CO<sub>2</sub> tax on mineral oil and subject to a reduced tax rate on natural gas and LPG.<sup>1</sup>

### **Recycling**

Norway directs the CO<sub>2</sub> tax revenue to the general budget. The funds have been used to finance a special pension fund.<sup>1</sup>

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