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Zappers skim cash sales at retail. Zappers are add-on programs used by merchants with electronic cash registers (ECRs) or point-of-sale (POS) systems. Zappers are smart and selective. They do not skim all sales, and they never skim credit card transactions.[1]

Although they are present in every jurisdiction, Zappers appear to be most widely used in developed economies that combine high levels of cash sales with high rates of consumption tax.[2] Sweden, for example, has a cash-intensive economy, one of the world's highest VAT rates (25%), and also reports that 70% of the ECRs in the country are either "… constructed for manipulation or have had software installed that allow sales to be manipulated (Zappers)…"[3] This article focuses on Zappers but acknowledges that technology-assisted skimming may also occur because some ECRs are constructed for manipulation, that is the ECR comes ready-made with programming that allows manipulation (Phantomware[4]). Zappers are the more serious threat.

Although widely used, Zappers are not widely detected. They remain hidden from tax administrations largely because: (a) Zappers are removed after use; (b) uncovering usage requires more technical expertise than the average examination team possesses, and (c) Zappers are concentrated in difficult-to-audit small and medium sized enterprises (SMEs) – privately held restaurant chains, supermarkets, and convenience stores.

Skimming is not a new fraud. Small businesses have always skimmed – hiding true sales figures from the taxman with a second till. Zappers however, take this old fraud to a new level of sophistication – this is automated skimming conducted remotely at a time and place distant

[1] For example, Zappers rarely skim alcohol sales, because most jurisdictions regulate alcohol. "Missing" alcohol sales are too easy to spot. Credit card sales also leave paper trails and for this reason Zappers do not targeted them.
[2] For example even though Japan and Sweden are among the most cash intensive developed economies, there have been no reports of Zappers in Japan, whereas the Zapper problem is so serious in Sweden that all ECRs were required to be secured and certified as of January 1, 2010. Sweden's VAT reaches 25% whereas the Japanese Consumption Tax is a flat 5%. The US has one of the least cash intensive economies, with retail sales taxes uniformly in the single digits and has reported only two Zapper cases. *See*: David B. Humphrey, Lawrence B. Pulley & Jukka M. Vesala, *Cash, paper, Electronic Payments: A Cross-Country Analysis*, 28 Journal of Money, Credit and Banking 914, 917 at Table 1 (Nov. 1996) (indicating that of the 14 countries considered Japan was second only to Switzerland in the use of cash, and Sweden placed fourth after the Netherlands, and the US was either last or next to last).
[3] Bo Arvidsson, Tax Director, Swedish Tax Agency, *Personal e-mail communication* (Feb. 18, 2010) on file with author (referencing a study conducted by the Swedish Tax Agency in 2007 that was based on a random sample of all cash registers in Sweden, indicating also that controls during recent years have not give the Tax Agency any reason to revise its 70% estimate, but further indicating that the study does *not* indicate that 70% of ECRs were *actually used* for manipulation – only that they were *able* to be use for sales suppression).
[4] Phantomware is factory-installed software that is standard on some ECRs. Zappers are different. They are manually inserted in an ECR, commonly on a memory stick. Zappers can be removed (physically hidden) when an audit commences. For a discussion of differences see: Richard T. Ainsworth, *Zappers and Phantonware: The Need for Fraud Prevention Technology*, 50 TAX NOTES INT'L 1017 (Jun. 23, 2008); Richard T. Ainsworth, *Zappers and Phantomware: Are State Tax Administrators Listening Now?* 49 STATE TAX NOTES 103 (July 14, 2008).

from the point of sale. This is skimming by the proprietor unbeknownst to the cashier who actually makes the sale, issues the receipt and collects the cash.

An effective Zapper program will not only delete sales records, it will re-number and re-calculate the records of each receipt, and will produce perfectly conforming financial reports for tax examination. In some cases (particularly when Zappers are embedded in POS systems) this technology can reach beyond the ECR and move up the commercial supply chain, adjusting inventory and employee time records so that all records conform with line-item deletions at the cash register. It is hard to justify full inventory usage and a full complement of waiters in a restaurant that consistently reports less than a full volume of sales. The best Zappers take care of this.

Zappers however, are a double-edged sword. An absentee owner who hires either the wrong management firm or a technology-savvy night-shift manager may find a Zapper being used as an embezzlement tool.[5] This is one of the reasons the Dutch Tax Administration has found success in working *with* business owners and ECR providers to eliminate Zappers. The Dutch have had success with this approach.[6]

The Dutch approach is not universal. Others use technology to fight technology. There are a range of opinions on what to do in this regard. They range from the Greek belief that no business should make retail sales without a certified ECR, to the Quebec attitude that only in the most problematical sectors of the economy should ECRs be certified.

SIGNIFICANCE

How serious are revenue losses from Zappers? In addition to Sweden, both Quebec and Germany have conducted studies of automated sales suppression. These studies underscored a need for legislative change. Full results have not been made public.

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[5] This is what happened to Celine Dion. Each of her 32 Nickel restaurants had Zappers installed by the management firm she hired to run them. For a celebrity this can be a public relations as well as a financial disaster. Thus, the Canadian press carried a number of news stories that included paragraphs like the following:

> Executives of the Nickels chain went to great lengths Friday to distance Dion from the investigation into possible tax fraud. Gioia Pasqualini, the chain's marketing co-ordinator said: "We want to emphasize that Celine Dion is not part of the daily operations, the daily process at Nickels."

CBC.com, *Celine Dion-owned Restaurants Raided by Revenue Quebec*, (Nov. 10, 2000) *available at* http://www.cbc.ca/canada/story/1999/03/13/dion_restaurant990313.html. See also: Revenue Quebec, News Release, *Zappers : un administrateur de la société Gamma Terminal Inc. reconnu coupable* (Eng. Trans. *Zappers: Company Director Gamma Terminal Inc. Guilty*) (Nov. 15, 2000) (indicating that Rejean Turcott, the Director of Gamma Terminals Inc. pled guilty to selling zappers to the Nickel Restaurants) (French only) *available at* *http://www.revenu.gouv.qc.ca/fr/ministere/centre_information/communiques/ev-fisc/2000/15nov.asp*. Mr. Turcott's company, Gamma Terminals Inc., is a Canadian company that holds the exclusive Canadian sales rights to a restaurant computer system manufactured by an American company, Gamma Micro Systems.

[6] For example, Ben B.G.A.M. van der Zwet (EDP auditor with the Dutch Belastingdienst) indicates that Sharp Benelux Cash Registers invites groups of auditors to in-house demonstrations of update on the latest SHARP cash register systems. In addition, after a recent audit of Chinese restaurants where various versions of Phantomware were uncovered in ECRs and EPOS systems, the Belastingdienst was invited to make presentations at a Chinese restaurant owners association to challenge owners to implement better systems. *Personal e-mail correspondence* February 18, 2010 (on file with author).

Quebec. The government of Quebec conducted two studies. Both focused on the restaurant sector. The first followed the customer list of an early zapper distributor/developer.[7] This investigation (the First Inspection Wave) examined 70 systems and uncovered 41 zappers.[8] A more statistically accurate investigation followed (the Second Inspection Wave). This study was based on a random sampling of businesses (but again, only within the restaurant and hospitality industry). Finance Quebec determined that 16% of all sales went unreported.[9]

These studies supported the Quebec Minister of Revenue, Jean-Marc Fournier, when he announced on January 28, 2008 that there would be legislative changes, enhanced enforcement efforts, and a technology-intensive pilot project designed to counter sales suppression devices in the restaurant sector. He indicated:

> Although the majority of restaurant owners comply with their tax obligations, the restaurant sector remains an area of the Quebec economy where tax evasion is rampant, both in terms of income taxes and sales taxes. Tax losses in this sector are significant. Revenue Quebec estimates them at $425 million for the 2007-2008 fiscal year.[10]

The $425 million figure is comprised of $133 million in QST and $284 million in income tax losses. There are comparable losses of federal revenue (both GST and income tax). These losses are *in addition* to the Provincial level losses.[11]

To get a sense of what the Quebec figures mean, the following extrapolation can be made. If we assume all other factors equal,[12] then simply based on comparative GDP figures the

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[7] Turcotte v Quebec (Ministry of Revenue) 1998 CarswellQue 1041, [1998] R.D.F.Q. 110 Superior Court of Quebec. This case lead to a number of convictions of restaurant owners that used Zappers to delete sales records. *See*: Revenue Quebec, Press Release, *Deux sociétés coupables d'avoir utilisé un camoufleur de ventes dans des restaurants de Laval et de Repentigny* (*Two companies guilty of having used a camoufleur sales in restaurants in Laval and Repentigny*) April 25, 2005 *available at* http://www.revenu.gouv.qc.ca/eng/ministere/centre_information/communiques/ev-fisc/2005/25avril.asp (in French).

[8] Dave Bergeron & Richard Ainsworth, *Zappers (Automated Sales Suppression)* 12, powerpoint presentation at the New York Prosecutors Training Institute (Syracuse, NY) July 31, 2008 (on file with author).

[9] *Id.* at 13 (but noting further that the 16% figure measures all skimming frauds, not just skimming with Zappers).

[10] Revenue Quebec, Press Release, Jean-Marc Fornier, *Pour plus d'équité dans la restauration : il faut que ça se passe au-dessus de la table* (For more equity in the restaurant sector it is required that [business is conducted] above the table) *available at* : http://www.revenu.gouv.qc.ca/eng/ministere/centre_information/communiques/autres/2008/28jan.asp (last visited August 7, 2008). See also the accompanying powerpoint presentation, *Tax Evasion in Quebec : Obligatory Billing in the Restaurant Sector – Under-declaration of revenues in the restaurant sector*, 3 (January 28, 2008) (in French) (on file with author, with translation).

[11] Gilles Bernard (Direction générale adjointe de la recherché fiscal, Ministry of Revenue Quebec) *Personal e-mail communication,* June 23, 2009 responding to a question on the $425 million figure. He indicated that there were ancillary losses of $8 million in other (unspecified taxes), but:

> The tax losses are 417 M$ (QST + Income Tax). The QST represents 133M$ and the Income tax losses are 284M$. This amount can be doubled to take into account the federal income tax [and GST].

[12] Of course "other things" are not equal. Zappers reduce reported taxable income of businesses, and businesses tend to use these funds either to pay undeclared dividends to owners or provide employee unreported wages. In most cases the Quebec rates are lower than the comparable European rates. Quebec's VAT (the QST) is 7.5%; the Corporate Income Tax is 11.9% (although a reduced rate for small businesses is imposed at 8%); personal income is taxed at rates between 16% and 24% (indexed with an inflation factor of 2.36%).

losses in the EU from fraud suppression (measured in Canadian dollars) would be around $23 billion per year in the restaurant sector. Germany would top the list followed by the UK, France, Italy and then Spain.

Country	Revenue Loss (in millions)	Country	Revenue Loss (in millions)
Austria	508.7	Latvia	58.4
Belgium	600.5	Lithuania	100.1
Bulgaria	145.9	Luxembourg	79.2
Cyprus	33.4	Malta	16.7
Czech Republic	404.5	Netherlands	1,042.5
Denmark	316.9	Poland	1,030.0
Estonia	41.7	Portugal	362.8
Finland	296.0	Romania	417.0
France [3]	**3,294.3**	Slovakia	183.5
Germany [1]	**4,503.6**	Slovenia	87.6
Greece	529.6	**Spain [5]**	**2,160.1**
Hungary	304.4	Sweden	529.6
Ireland	291.9	**United Kingdom [2]**	**3,448.6**
Italy [4]	**2,806.4**		
	TOTAL	**23,593.9**	

Germany. Given these results, it is not surprising that Germany is the other jurisdiction where Zapper studies have been undertaken. The Interim Report of the German Working Group on Cash Registers[13] indicates that it is "… aware of [technology-assisted] fraud amounting to 50% of companies cash receipts."[14] The Working Group does not identify the kinds of *technology-assisted* fraud involved (Phantomware or Zappers). Most likely it found both.

The Working Group's 50% observation is supported by another report made by the German Federal Audit Office (BHR) to the German Parliament in 2003. In this report the BHR appears to focus only on factory installed software (Phantomware).[15] The BHR concludes that the potential loss in Germany is in the billions of euros:

> The Federal Audit Office (BHR) has complained that later models of electronic cash registers and cash management systems now fail to meet the principles of correct accounting practice when it comes to recording transactions … The risk of tax fraud running into *many billions* [of euro] should not be underestimated in cash transactions.[16]

The BHR's rough estimate seems to correlate with the Quebec extrapolation which estimated German losses (in the restaurant industry) to be about $4.5 billion.

[13] The German Working Group on Cash Registers is comprised of the highest-tier central and regional tax authorities. Only an Interim Report has been made public.
[14] Working Group on Cash Registers: Interim Report 5 (Mar. 16, 2005) (Ger.) (translation on file with author).
[15] *Id.* at 5 (listing the following attributes of the software it examined: the software can; (1) erase all data entries, (2) reset the zero counter, (3) add erroneous counter-entries, (4) allows unrecorded use of the training mode, and (5) permits suppression of the grand total memory).
[16] BHR comments 2003, No 54, Federal Parliament circular 15/2020 *cited in Id*. at 5 (emphasis added).

But further, both the BHR's observations and the Working Group's study are supported by another set of German studies, this time conducted by three German federal states. These studies, like those in Quebec, focus only on the restaurant sector. They too conclude that sales suppression is a significant problem:

> One federal state is currently implementing a special "restaurant" initiative. Checks already made have led to average upward revisions of 46% of original turnover. A comparable initiative in another federal state resulted in over half the cases (54%) having upward revisions of 60% of declared turnover. Fraud amounting to 25% was detected in a fifth of the cases, and was as high as 5% in the remaining 26% of cases. A third federal state has found that around 45% of till receipts involving cash are subject to upward revisions ranging from 20% to 118%.[17]

FOUR CASE STUDIES

A good overview of this field can be gleaned from a case study review. There are notable Zapper cases from many jurisdictions, but no tax authority has had more activity in this area than Quebec and the Netherlands. In Quebec over 230 cases involving *camifleur de ventes* (or sales zappers) have gone to litigation since 1997.[18] The Netherlands has a similar number, but an official count is not available. Three Quebec cases (Audio Lab, the Stratos restaurants, and the investigations involving Luc Primeau) and a Dutch case (Grand Café Dudok) are considered below.

Audio Lab. This investigation became public on April 8, 2004 after search warrants were executed at the San Antonio Grill, a restaurant in Laval, Quebec. The software used at the San Antonio Grill to account for sales, determine the tax due and draft receipts was called Softdine. The allegation was that a *camoufleur de ventes* was used to delete sales records.[19] The owner pleaded guilty one year later.[20]

But the investigation did not end with the San Antonio Grill. On October 14, 2005, Revenue Quebec announced that it was executing five more search warrants in Montreal and Laval on Audio Lab LP, Inc. as it was under suspicion of having developed and marketed the sales Zapper used in the cash registers at San Antonio's Grill. Audio Lab LP, it turns out, not only developed the operating software in the cash registers at San Antonio's Grill (Softdine),[21] but it developed and sold the Zapper that defeated it.

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[17] *Id.* at 5.

[18] Jean-Marc Fornier, *L'évasion fiscale au Québec : Facturation obligatoire dans le secteur de la restauration – Sous-déclaration des revenus dans le secteur de la restauration* (Tax Evasion in Quebec : Obligatory Billing in the Restaurant Sector – Under-declaration of revenues in the restaurant sector) 3 (January 28, 2008) (in French) (powerpoint presentation and translation on file with author).

[19] Revenue Quebec, News Release, Tax Evasion: The Ministry of Revenue Suspects the Restaurant Grill San Antonio de Laval of having used a Zapper (Apr. 8, 2004) *available at*: http://www.revenu.gouv.qc.ca/eng/ministere/centre_information/communiques/ev-fisc/2004/08avril.asp (in French only, last visited Feb. 8, 2008).

[20] The director, Mr. Apostolos Mandaltsis, was personally fined $65,681.00 and $10,300 respectively for PST (Provincial Sales Tax) and GST (federal Goods and Services Tax). Taxes and interest were due in addition.

[21] Revenue Quebec, News Release, Revenue Quebec Investigation of a Software Designer Outlet Suspected of having Developed and Distributed Zappers (Oct. 14, 2005) *available at*:

On June 26, 2007 Audio Lab LP, Inc. pleaded guilty to charges of having, "… designed and marketed a computer program designed to alter, amend, delete, cancel or otherwise alter accounting data in sales records kept by means of software that [Audio Lab LP] had designed and marketed."[22]

Stratos Restaurants. This investigation highlights two other characteristics of large scale technology-assisted skimming frauds: the way skimmed cash is used to corrupt other businesses (businesses selling to the "zapping" enterprise) and the ease with which this fraud can sweep through a chain of related businesses. To dispose of the excess cash from skimmed sales the Stratos restaurants (1) put a double billing system in place with suppliers (to conceal purchases made without invoices in cash), and (2) wages were paid to employees in cash (and were not reported as income). The first action pushed fraud up the supply chain, because suppliers would not be charging or reporting QST on their sales, nor would they be inclined to include these sales in taxable receipts on their business income tax returns. The second action pushes the fraud down the business chain, because employees receiving cash payments are unlikely to report the additional cash as wages, nor would they volunteer additional social security taxes on these amounts.

The vertical spread of the fraud (up and down the supply chain) was matched by its horizontal spread (throughout the chain of related restaurants). All together twenty-eight Stratos restaurants eventually were involved in the fraud. Guilty pleas came in waves – nineteen companies pleaded guilty on September 26, 2002; another six on October 11, 2002, and the four remaining on March 21, 2003.

Press releases provide details of only the final ten companies. In aggregate the taxes and penalties for these companies came to $1,816,070.90, but the real thrust of the news releases were that "… the Department has conducted searches in order to establish proof that the designer of the IT function associated with the cash register software Terminal Resto had participated in the scheme set up by restaurants in the Stratos chain."[23] On April 25, 2003, Mr. Michel Roy and his two sons Danny and Miguel admitted that they were guilty of facilitating the Stratos tax evasion. The father (Michel) was the creator of the Zapper that worked with Resto Terminal. He promoted it and made the sales. His sons (Miguel and Danny) were also implicated in creating the zapper. Aggregate fraud penalties assessed against the Roys were $1,064,459.[24]

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http://www.revenu.gouv.qc.ca/eng/ministere/centre_information/communiques/ev-fisc/2005/14oct(2).asp (in French only, last visited Feb. 8, 2008).

[22] Revenue Quebec, News Release, The Company Audio LP, Inc. Convicted of Tax Evasion (Sept. 21, 2007) (on the conviction fines were imposed of $12,475) *available at*: http://www.revenu.gouv.qc.ca/eng/ministere/centre_information/communiques/ev-fisc/2007/21sep.asp (in French only, last visited Feb. 8, 2008).

[23] The breakdown is: $429,179.07 (GST) + $492,023.11 (PST) + $214,589.55 (federal penalties) + $625,028.89 (provincial penalties) + $55,250.28 (judicial fees). Revenue Quebec, News Release, All Stratos Restaurants Convicted of Fraud in Connection with the use of a Zapper (Mar. 18, 2003) *available at*: http://www.revenu.gouv.qc.ca/eng/ministere/centre_information/communiques/ev-fisc/2003/18mars.asp (in French only, last visited Feb. 8, 2008).

[24] Revenue Quebec, News Release, Fines of more than One million dollars – A Father and his Two Sons convicted for Tax Evasion in connection with the Zapper (May 2, 2003) *available at*:

Luc Primeau. This is the case of a software designer who became the focus of an investigation that began with the announcement on March 17, 2003 that seven Patio Vidal restaurant franchises and a bar, La Tasca, from Gatineau, Quebec as well as another bar named O'Max in Masson-Angers, Quebec were convicted of adding Zappers to their Microflash cash register software (later upgraded to a new version called Caracara). Mr. Primeau not only designed Microflash and Caracara, but was the developer of the associated Zapper program that these businesses used.[25]

On October 17, 2005 Mr. Primeau admitted that his software assisted these companies to evade $435,000 in GST and QST. All together these companies skimmed $2.7 million in cash sales. Mr. Primeau was fined for his involvement. Luc Primeau is the classic example of the software designer who is a real threat to the tax system. Morphing into a business consultant Mr. Primeau actively spread Zappers throughout the restaurant sector. He brought this fraud to a series of bars and restaurants that might not have skimmed sales if the risk of detection were not minimized by his software.[26]

Grand Café Dudok.[27] Dudok skimmed cash receipts with a primitive Zapper and used a portion of the cash to pay employees under the table. The Belastingdienst (Dutch IRS) was suspicious of the low wages reported, and thought that additional (unreported) compensation might be being distributed (under the table).[28]

Testimony in the case indicated that on the second day of the payroll audit the managing director of Straight Systems BV visited Dudok where he was approached by the Dudok's owner-manager. Straight Systems BV supplied the Finishing Touch point-of-sale cash registers that were used by Dudok. The owner-manager explained that he was having difficulty accounting for reported wages, in part because the auditors were also questioning the turnover. The numbers did

http://www.revenu.gouv.qc.ca/eng/ministere/centre_information/communiques/ev-fisc/2003/02mai.asp (in French only, last visited Feb. 8, 2008).

[25] Revenue Quebec, News Release, Mr. Marcel St. Louis de l'Outaouais Convicted of Tax Evasion related to the use of a Zapper (Mar. 17, 2003) *available at*: http://www.revenu.gouv.qc.ca/eng/ministere/centre_information/communiques/ev-fisc/2003/17mars.asp (in French only, last visited Feb. 8, 2008).

[26] Revenue Quebec, News Release, The Zapper Designer of Boucherville Pleads Guilty to Various Charges brought by Inland Revenue Quebec (Oct. 26, 2005) (additional penalties of $22,513.19 under the GST and QST, as well as income tax of $17,297.08 and related penalties of $26,621.35) *available at*: http://www.revenu.gouv.qc.ca/eng/ministere/centre_information/communiques/ev-fisc/2005/26oct.asp (in French only, last visited Feb. 8, 2008).

[27] District Court of Rotterdam, LJN: AX6802 (Jun 2, 2006) *available at*: http://zoeken.rechtspraak.nl/resultpage.aspx?snelzoeken=true&searchtype=ljn&ljn=AX6802 (in Dutch) (translation on file with author); appealed to the District Court of The Hague where the judgment is upheld LJN: BC5500 (Feb. 29, 2008) *available at*: http://zoeken.rechtspraak.nl (in Dutch) (translation on file with author).

[28] LJN: BC5500, at F3. Dudok was skimming sales in a very amateur fashion. The entire sales records of the POS system were deleted and records were reconstructed on x-cell spreadsheets. The examining agents did not trust the spreadsheets and asked for the POS records as a back-up to confirm what they were being shown on the audit. This in turn led to the conversation with Straight Systems BV where Dudok was informed that they already had phantom-ware installed in their system. Ben B.G.A.M. van der Zwet, *Personal e-mail correspondence*, (May 28, 2008) (on file with author).

not "seem right" to the auditors, and they were requesting back-up data, something that would lead them to the Zapper.

The managing director of Straight Systems explained the existence of a more sophisticated Zapper (a Phantomware application), the "hidden delete" option embedded in Finishing Touch cash registers. This was, "… a hidden menu option that, after enabling …, allowed operators of catering establishments to delete cash register receipts from the system."[29] After this discussion "… an employee of [Straight Systems] visited [Dudok] and explained [and enabled] the application of the erase rule [or hidden delete function[30]], after which [Dudok] subsequently decided to start using [it] …"[31]

The court upheld criminal tax fraud determinations in the Dudok case under income, value added, and payroll taxes. Both the restaurant operator and the ECR/ software provider were convicted.

But this is not the end of the story. On February 18, 2010 the Belastingdienst found that Bork Automatisering had installed a Belgian business software system (DINO) in the Grand Café. The supplier of explained its benefits to the agents.

Among the more interesting revelations was that not only did DINO produce far more accurate tax compliance, but it uncovered additional internal frauds (approaching 20% of Dudok's turnover) that were threatening the viability of the Grand Café. Thus, much like the Celine Dion cases in Canada[32] sales suppression can be as much of a problem for business owners as it is for tax authorities.

ENFORCEMENT TRENDS & NEW SOLUTIONS

Two policy orientations guide enforcement actions in this area – one approach is rules-based; the other is principles-based.[33] They are not mutually exclusive – degrees of blending are common.

Rules-based jurisdictions adopt comprehensive and mandatory legislation regulating, and/ or certifying cash registers. Greece takes this approach.[34] These jurisdictions are classified generally as fiscal till (also called fiscal memory) jurisdictions.

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[29] LJN: AX6802, at Consideration of the Evidence (Jun 2, 2006) (in Dutch) (translation on file with author). The case discusses three software programs: Twenty/Twenty; Finishing Touch; Tickview.exe. Twenty/Twenty was a US touch-screen program that did not have a phantom-ware application. Straight Systems BV added the phantom-ware application to Twenty/Twenty and renamed the program Finishing Touch. This program allows the operator to view the sales ticket and change data. With a secret command the Tickview.exe program within Finishing Touch can be activated and the operator is asked if they would like to delete the whole ticket. If an affirmative response is given then the system records a "no sale" and the entire audit trail to the original data is eliminated. Ben B.G.A.M. van der Zwet, *Personal e-mail correspondence*, (May 28, 2008) (on file with author).

[30] The trial court in Rotterdam refers to the phantom-ware application as a "hidden delete function" whereas the appeals court in The Hague refers to the phantom-ware as "the erase rule."

[31] LJN: BC5500, at F3.

[32] *Supra* note 5.

[33] Fiscalis Committee Project Group 12, Cash Register Project Group, *Cash Register Good Practice Guide*, 5-6 (Dec. 2006) (unpublished report on file with author).

Principles-based jurisdictions rely on compliant taxpayers following the rules. Compliance is enforced with an enhanced audit regime. Comprehensive, multi-tax audits (the simultaneous examination of income, consumption and employment returns) are performed by teams that include computer audit specialists. Audits are frequently unannounced and preceded by undercover investigations that collect data to be verified.[35] The Netherlands takes this approach.[36]

The current trend appears to be for traditional, principles-based jurisdictions to selectively adopt rules-based enforcement strategies. Whether the reason for this movement is resource limitations that prevent fully comprehensive audits or a new-found awareness of the magnitude of this fraud is unclear. Recent developments in Quebec, Sweden and Belgium bear this out.

Quebec. After ten years of aggressive principles-based enforcement the Province of Quebec became acutely aware that it would be seeing at least 500 new sales suppression cases each year, and along with these cases there would be roughly 10,000 new delinquent accounts. Staffing was not adequate to respond, and the need for technology training was imperative. As a result, by 2008 Quebec began to seriously look at technological solutions to secure ECRs. An important part of what Quebec also wanted was a mechanism whereby it could rapidly survey large numbers of ECRs with auditors that had less that optimal training.[37]

Quebec's answer was the Sales Recording Module (SRM) – a device that secured ECR data and then digitally signed each receipt with a bar code that could be read with a hand-held optical scanner.[38] A pilot project involving 46 restaurants in seven cities is underway, and a full rollout is expected by 2011. When fully implemented every restaurant in the Province will be

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[34] Argentina, Brazil, Bulgaria, Italy, Latvia, Lithuania, Poland, Russia, Turkey, and Venezuela are among the countries that certify cash registers currently. Penalties are applied for the sale or use of non-certified cash registers. FISCALIS COMMITTEE PROJECT GROUP 12, CASH REGISTER PROJECT GROUP, CASH REGISTER GOOD PRACTICE GUIDE, (Dec. 2006) at Appendix B, ¶1 (unpublished report on file with author).

[35] For example, the recent Canadian investigation in British Columbia into alleged distribution of sales suppression software by InfoSpec Systems Inc. involved an eight month undercover investigation by the Royal Canadian Mounted Police (RCMP). During this phase of the operation undercover RCMP officers posed as potential buyers of sales suppression software. This evidence supported allegations that InfoSpec Systems Inc. knowingly provided restaurants with zappers. Canada Revenue Agency, News Release, *Charges Laid in Large-Scale Tax Fraud Investigation* (Dec. 10, 2008) *available at*: http://www.cra-arc.gc.ca/nwsrm/rlss/2008/m12/nr081210-eng.html (last visited Dec. 25, 2008).

[36] Canada, the UK and most US retail sales tax jurisdictions also fall in this category.

[37] Gilles Bernard, *Solution for the Underreporting of Income in the Restaurant Sector,* 2, powerpoint presentation (Denver, June 2, 2009) Federation of Tax Administrators Annual Conference.

[38] The value of the hand-held reader to auditors cannot be underestimated. The German reaction to Quebec's use of a bar code scanner when it was demonstrated at the FTA conference in Denver, Colorado (June 2, 2009) was very positive, and may even be emulated:

> In our [German] solution we print the digital signature at the receipt. If you want to verify the receipt you have to type all data of receipt including the signature [into a PC]. It takes a long time because you will make input errors. [If] … you test it, you will find out that this is not a good practice. … I [have used] a pencil scanner … It works good and you are much faster. You can also use a normal scanner with OCR. We are testing different solutions … If we use barcodes we [will need to] have to have a barcode scanner….

Personal e-mail communication with Dr. Zisky (August 10, 2009) (on file with author).

required to install the government provided device, and Revenue Quebec will then be able to conduct two levels of audits: (1) short inspections – where an auditor in a thirty minute visit, observes that customers are receiving receipts, and then quickly verifies (with the scanner) that the receipts being issued are recorded in the SRM,[39] and (2) full inspections – regular scheduled audits or audits invoked because of irregularities identified by rapid inspection teams.[40]

Quebec's bookkeeping and record keeping requirements mandate the retention of electronic data (and the means to read that data).[41] The digital signature, digital fingerprint and all recorded data is preserved within the fiscal memory of the SRM for seven years.[42] Quebec's concern is with Z and X Reports, the Electronic Journal, and all supporting files within an ECR or POS system. Because Zappers manipulate these kinds of digital records Quebec prohibits the design, manufacture, installation, sale or lease of Zappers in the Province.[43] Revenue Quebec is authorized to presume whenever it finds a zapper that it has been used it to suppress sales.[44]

Quebec legislatively defines a legal receipt,[45] and makes it a central enforcement document. Penalties for not issuing a legal receipt are serious. Operators who fail to remit a receipt will incur a penalty of $100 (for each non-issued receipt), and be liable for an additional fine (no less than $300; no more than $5,000 per incident). For a second offence within five years, the fine is no less than $1,000 and no more than $10,000 per incident, and for any subsequent offence within that period, no less than $5,000 and no more than $50,000 per incident.[46]

Sweden. Unlike Quebec which will provide the SRM at government expense, Sweden will use certification. Proprietors are required to purchase government certified "control units." The control unit can be added-on or embedded (part of the ECR, as manufactured). The Swedish mandate is not limited to the restaurant industry; it encompasses all retail establishments (with various exceptions for small companies, or publicly held companies, or for companies who register their privately designed software).

Manufacturers obtain encryption keys from the Swedish Tax Agency and use them to create unique keys in the control unit during the manufacturing process. Applications for

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[39] Revenue Quebec will not disclose the data elements that are selected for encryption. It is "confidential for security reasons." Marc Simard, personal e-mail communication August 10, 2009 (on file with author).

[40] Gilles Bernard, *Solutions for the Under-reporting of income in the Restaurant Sector,* Federation of Tax Administrators Annual Conference, Denver Colorado (June 2, 2009) powerpoint slides at 15-17 (on file with author).

[41] Act Respecting the Ministry of Revenue, R.S.Q., c. M-31, § 34 & 35 (Quebec).

[42] Jean-Marc Fornier, *L'évasion fiscale au Québec : Facturation obligatoire dans le secteur de la restauration – Sous-déclaration des revenus dans le secteur de la restauration* (Tax Evasion in Quebec : Obligatory Billing in the Restaurant Sector – Under-declaration of revenues in the restaurant sector) slides 6-8 (January 28, 2008) (in French) (powerpoint presentation and translation on file with author).

[43] Act Respecting the Ministry of Revenue, R.S.Q., c. M-31, § 34.2 (Quebec).

[44] Act Respecting the Ministry of Revenue, R.S.Q., c. M-31, § 34.1 (Quebec).

[45] Requirement for "legal receipts" can be fiscal till jurisdictions like found in Hungary, Greece Finland, Portugal, Denmark, and Latvia. *See supra* note 33, *Cash Register Good Practice Guide*, Appendix A at ¶¶ 1.3.1.1-1.3.1.5 & D at 3.2.1 & 4.2.6.

[46] FINANCE QUEBEC, 2006-2007 BUDGET: ADDITIONAL INFORMATION ON THE BUDGETARY MEASURES 144-45 (Mar. 2006).

encryption keys are made to the Swedish Tax Agency.[47] A series of regulations have been issued that set out the details of the program.[48]

Certification is by an independent company appointed by the Swedish Board for Accreditation and Conformity Assessment, SWEDAC. Control units are connected to the ECR and the printer. Data is saved (signed and encrypted) in the control unit and a control code is printed on the cash receipt. Control units are certified for use with a specific ECR model.

The law is effective January 1, 2010,[49] but it has been delayed until June 30, 2010. Approximately 200, 000 establishments need to make equipment purchases,[50] and at the present time only 30,000 units are in place.

Belgium. The Belgian effort appears to be a blend of the Swedish and Quebec approaches. Like Quebec, Belgium is concerned only with restaurant sales, but like Sweden it will certify third-party devices rather than provide them at government expense.

The Tax Administration is given considerable latitude to determine certification standards. Minimum requirements are set out in the Royal Decree of December 30, 2009.[51] Simplified invoices are now required to be issued by all *restaurants and catering services* (prior to this date no establishment was *required* to issue a receipt in a business-to-consumer sale). In addition, as of January 1, 2013 this simplified invoice must be produced by a certified cash register system (new article 13bis added to Royal Decree No. 1 of December 29, 1992 by Royal Decree of December 18, 2009).[52] There is no grace period for *new* restaurants. They must comply with the new rules when they begin operation.

Interestingly, Belgium did not conduct a formal study before it embarked on this program. Audit results were sufficiently indicative of a problem.[53]

CONCLUSION

Tax and technology critically intersect in the retail marketplace. The outcome is not always for the best. Zapper and Phantonware technology is widely available and they make it

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[47] *See*: Skatteverket, Cash Register Legislation Becomes Effective January 1, 2010 *available at*: http://www.skatteverket.se/foretagorganisationer/startadrivaforetag/kassaregister/newcashregisterlegislationbecomeseffective1january2010.4.69ef368911e1304a6258000272.html
[48] SKVFS2009:1; SKVFS2009:2; SKVFS2009:3
[49] Swedish Parliament (2007:592). A delay in implementation has been granted until June 30, 2010.
[50] Bo Arvidsson, Tax Director, Swedish Tax Agency, *Personal e-mail communication* (Feb. 18, 2010) on file with author.
[51] The requirements for a certified cash register can be found at: Koninklijk Besluit van 30 december 2009 tot het bepalen van de definitie en de voorwaarden waar aan een geregistreerd kassa-systeem in de horeca sector moet voldoen, artikelen 1 en 2, Belgisch Staatsblad, 31 december 2009, blz. 82981 (in Dutch).
[52] The new requirements for restaurant invoices can be found at: Koninklijk Besluit van 18 december 2009 tot wijziging van het koninklijk besluit nr. 1 van 29 december 1992 met betrekking tot de regeling voor de voldoening van de belasting over de toegevoegde waarde, artikel 1, Belgisch Staatsblad, 24 december 2009, blz. 81364 (in Dutch).
[53] Jan de Loddere, Inspector Belgian Tax Administration, *personal e-mail communication*, (February 18, 2010) on file with author.

easier for SMEs to skim cash sales. This technology substantially reduces the risk of being caught.

This is not the only marketplace where the tax/ technology intersection is problematical. On a far larger scale MTIC (missing trader intra-community) fraud is also a technology driven theft of public revenue by criminals. These frauds include the well known carousel frauds in cell phones and computer chips,[54] MTIC fraud in CO2 permits,[55] the yet to be fully investigated VoIP MTIC,[56] as well as MTIC in the electricity and gas exchanges.[57]

Tax authorities are fighting back all along the technology front. There are intensive traditional audits as well as concerted efforts to blunt the effectiveness of the fraud with technology. But, if there is one distinguishing characteristic of Zapper enforcement efforts (when contrasted with the efforts devoted to MTIC fraud) it is that here the authorities are embracing technology-based solutions. This is not the case (as yet) with MTIC. This effort to fight technology-with-technology has produced a measure of success as well as helped develop strategic partnerships around solutions. Cooperation is evident.

Consider, for example, the certification proposals under review by the Belgian Tax Administration. Belgium is looking at Swedish, German and private sector solutions. Coming as it does *after* many years of effort by others, Belgium stands on some strong shoulders.

Belgium is reviewing the SWEDAC standards which have already been applied to a number of systems, as well as the smart card solution developed by the INSIKA project of the German National Metrology Institute (PTB: Physikalisch-Technische Bundesanstalt). After more than two years of work the PTB has just published the technical specifications for an inexpensive signature smart card that can be embedded in ECRs or POS systems to secure data flows.[58] Data structures, formats, communication protocols and security analysis are all freely available.

With this background of Swedish and German efforts BMC Inc. responded to the Belgian search for an ECR security module by sending its eTax device into further development. BMC's eTax was already one of the few devices to meet SWEDAC standards. It was certified by the Swedish Tax Administration on August 24, 2009. However, by March 2010 BMC is planning to

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[54] Richard T. Ainsworth, *Tackling VAT Fraud: Car-flipping and Computer Chips on a Carousel*, 46 TAX NOTES INT'L 267 (April 16, 2007); *Tackling VAT Fraud: 13 Ways Forward*, 45 TAX NOTES INT'L 1069 (March 26, 2007).
[55] Richard T. Ainsworth, *MTIC Fraud Infects Tradable Carbon Permits* 55 TAX NOTES INT'L 733 (Aug. 31, 2009); Richard T. Ainsworth, *CO2 MTIC Fraud – Technologically Exploiting the EU VAT (Again)* 57 TAX NOTES INT'L 357 (January 25, 2010).
[56] Richard T. Ainsworth, *MTIC in VoIP*, 57 TAX NOTES INT'L (forthcoming).
[57] Europol Press Release, *Carbon Credit fraud causes more than 5 billion euros damage for European Taxpayer* (Dec. 9, 2009) (indicating that MTIC is entering the gas and electric exchanges) a*vailable at*: http://www.europol.europa.eu/index.asp?page=news&news=pr091209.htm; Richard T. Ainsworth, *MTIC in EU Power Exchanges – Electric*, TAX NOTES INT'L (forthcoming); Richard T. Ainsworth, *MTIC in EU Power Exchanges – Gas*, TAX NOTES INT'L (forthcoming).
[58]Mathias Neuhaus, Jörg Wolff & Norbert Zisky, *Proposal for an IT security standard for preventing tax fraud in cash registers*, Information Security Solutions Europe conference papers (September 2009) (copy on file with author); Ben B.G.A.M. van der Zwet, *Note: Draft 20080201 – Fiscal Obligations for Cash Registers in the Netherlands* 10 (Feb. 1, 2008) (unpublished draft on file with author).

demonstrate an enhanced eTax device, the Sales Data Controller (SDC). The SDC incorporates the INSIKA smart card into its protection profile. This new system appears to meet German, Swedish and Quebec demands for security. As currently presented, the BMC system appears to lack only one notable function – the ability to produce encrypted bar codes on receipts that can be read by a hand-held audit scanner.

This omission is an example of a design, not a technical limitation. The bar coded receipts of Quebec's SRM must be produced on thermal printers. Because some retail establishments still use dot-matrix printers, taking the Quebec approach on this point would compel these businesses to purchase new printers. This can be a compliance burden.

The decision on which way to go will impact tax practice and tax policy.[59] In effect, this is a decision to either permit or preclude Belgian "short inspection teams." Quebec favors this approach because of personnel and technology training issues, as well as their sense that the traditional audit (physically visiting business establishments and observing operations) has considerable merit. In this regard, Revenue Quebec shares the strongly held Dutch belief that the most effective intervention is the traditional audit, performed comprehensively by inquiring personnel from the tax office. The hand-held scanner is a *tool* that allowed Revenue Quebec to meet growing demands for technology intensive audits within the constraints of financial and human resource budgets.

The Belgian effort then, is a classic example of how a tax administration can use the marketplace to forge strategic partnerships that advance cutting-edge solutions. By controlling the specifications and insisting on free competition Belgium should be reasonable confident that it will find a balanced (cost-effective/ cutting-edge/ optimally secure) solution. Belgium is casting the net broadly, considering a wide range of government and private sector solutions. As technology advances, so too should the specifications.

> Belgium, at this point, is looking around for feasible technical solutions at reasonable cost for both tax payer and government and [which will offer] the highest possible protection. … The Belgian Government, will make a choice and then publish the required technical specifications … Whatever that choice will be, [the field for providing cash register security] will be open for competition, in accordance with all EU rules of free competition.[60]

The benefits of this dynamic are already evident. BMC's new Sales Data Controller (SDC) appears to incorporate the best attributes of the Swedish approved eTax module, the INSIKA smart card, and Quebec's SRM. All receipts will contain a unique electronic signature for each record. It will produce a transaction report containing all receipts identified by type and totals, dividing totals for each tax rate on both sales and refund amounts. It will preserve data and permit extraction only by the Tax Administration which will have the decryption algorithm. Is this the best solution? The competition will tell us.

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[59] Whether or not to have the ability to deploy "short inspection teams" is a policy, not a technology decision. BMC's SDC can be designed to produce thermal bar codes on receipts or not. The decision on this functionality is left in the hands of the Belgian Tax Administration. Goran Todorov, R&D Manager at BMC-Balkan, *Persona e-mail communication* (Feb. 23, 2010) on file with author.

[60] Jan C.A. de Loddere, Belgian Ministry of Finance, *Personal e-mail communication* (February 25, 2010) (on file with author).