Increase Effectiveness in Combating VAT Carousels
Detect, Prevent and Manage
Overview

VAT Carousel fraud, also known as ‘missing trader intra-community’ (MTIC) fraud, is an ever-increasing cost for European countries, as underlined by the current VAT gap in Europe which is estimated at almost 200 billion euro, of which 40 billion euro is lost to VAT Carousels/criminal organisations. Unlike other forms of tax evasion, such as the ‘hidden economy’ where the lost tax revenue remains within the economy, VAT Carousel fraud will often drain large sums of money out of the country itself.

According to a new study funded by the European Commission as part of its work to reform the VAT system in Europe as well as clamp down on tax evasion, an estimated 193 billion euro in VAT revenue was lost due to non-compliance or non-collection in 2011. Speaking on the findings of the study, Algirdas Semeta, EU Taxation Commissioner, commented “the amount of VAT that is slipping through the net is unacceptable; particularly given the impact such sums could have in bolstering public finances. However, there is also a positive message to be drawn from today’s findings. Our ambitious reform of the VAT system, the EU measures to combat tax evasion and our recommendations for national tax reforms, are all targeted in the right direction. We know the problem; we have identified solutions to it, and now it’s time for Member States to act.”

Setting up an early warning system for VAT Carousel fraud is a critical part of the EU’s action plan against tax losses, and a number of tax authorities have already made moves to address the problem and are beginning to see significant benefits as a result. This paper outlines the learnings and critical success factors identified by SAS in the work it has been doing with these pioneering tax authorities.

The Challenges

Although progress has been made by some of the leading tax authorities, the complexity of the nature of the fraud has made it difficult for authorities to rapidly mobilise their current operations in order to have a systematic approach to detect, prevent and manage VAT Carousel fraud. To help them in their task, SAS has been working with the more progressive tax authorities and has been able to “package up” an approach for dealing with these challenges:

- **Complexity:** The nature of the fraud requires a system to be able to identify the linkages between the chains of business involved in the fraud. Detecting fraudulent networks requires the analysis of millions of taxpayers, VAT returns and intra-community transactions.
- **Speed:** Unlike the traditional process of tax returns, where authorities potentially have years to recover the tax, VAT Carousel fraud is a high velocity fraud, and stopping the losses requires a fast response.

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1 Around one trillion euros is lost to tax evasion and avoidance every year in the EU - http://europa.eu/rapid/press-release_IP-12-1325_en.htm
2 An estimated €193 billion in VAT revenues (1.5% of GDP) was lost due to non-compliance or non-collection in 2011 - http://europa.eu/rapid/press-release_IP-13-844_en.htm
• **Limited analytic capabilities**: The inability to perform sophisticated analysis of transactions in order to identify suspicious companies, relationships and behaviours makes authorities susceptible to organised crime.

• **Manual processes**: Manually gathering and preparing data for fraud detection is time-consuming, tedious and highly error-prone; even traditional tools require a long time to process. Such processes typically require a suspicion of risk in order to initiate an investigation, as it is not possible to scan all of the data.

• **Limited resources**: Government human resources dedicated to prevent, detect, investigate and prosecute fraud and abuse cases are subject to attrition and are very limited.

• **Chasing money after the event**: Once missing traders are detected, it is very difficult to recover the money and authorities need to ensure they invest in capabilities to prevent fraud escalation.

### Capabilities

Working closely with government departments and financial institutions, the SAS® Fraud Framework has been specifically developed to address the issue of fraud. Built on the most comprehensive set of ‘big data’ tools, the platform is ideally suited for the detection of VAT Carousel fraud, as well as many other forms of tax non-compliance.

In addition to the many tools provided for customers to detect, prevent and manage fraud, it also provides a range of tax-specific fraud detection models. The broad capability of SAS analytics enables tax authorities to further utilise their investment in the SAS platform in order to address additional optimisation opportunities, such as customer segmentation and contact strategy optimisation, as well as debt collection optimisation.

Before looking at the detailed detection capabilities required for a VAT Carousel fraud management solution, it is useful to understand best practice in the overall concept of managing these types of challenges. Figure 1 provides an overview of the key business cycles involved.

![Figure 1: Fraud Management – Concept of Operations](image)
Scoring

This is the heart of the detection and prevention engine and is able to process very large volumes of historic data, identifying a range of different fraud modus operandi. It is also capable of scoring specific events, such as applications to create new companies, or payment requests, in real-time or batch. The SAS Fraud Framework uses the industry’s most advanced hybrid model for the detection of fraud.

Alert and Case Management

In order to effectively operationalise a fraud detection model, it is necessary to have an efficient environment to triage and perform the initial investigation of the alerts generated by the detection model. This provides queues for investigators to work (see Figure 2) and facilities to quickly see all the data in one place, including the reasons as to why a particular alert may have been raised (see Figure 3). This environment allows basic review and the ability to refer the alert for detailed investigation, or to close the alert.

Figure 2: Investigator Work Queue

Figure 3: Network showing Risky Companies and Transactions
Special Investigation

Once a case has been identified as high risk, a full investigation or case is raised. At this point the investigators have all the data assembled in an environment where detailed exploration can be carried out (see Figure 4). A fraud case management environment can be used to capture the evidence and orchestrate the specific fraud investigation. Crucially, it captures the outcome to ensure that investigated and fraudulent businesses, individuals, addresses, telephone numbers, etc. are captured on the database providing future risk indicators.

![Figure 4: Data Drill Down](image)

Management Information and Analytics

Once the system is operational, it is important to monitor the progress and effectiveness of the detection models and the investigation process. This will allow management to identify if additional analysis work is required to improve models, or the routing and handling of alerts. An environment to perform ad-hoc analysis is also useful to allow the discovery of new modus operandi of the fraudsters.

Hybrid Detection Model

VAT Carousel fraud is one of the most sophisticated fraud types faced by Tax authorities, and as such it needs a comprehensive analytics platform. SAS has utilised its full ‘Hybrid Model’ (see Figure 5) in the development of its VAT Carousel fraud models. It is only through the use of these different combined analysis techniques that these types of fraud can be automatically uncovered at acceptable False Positive rates.
These methods make use of data only recently available to Tax offices, and of data exchanged through Eurofisc. Therefore, with 80 per cent of the data used being collected from international systems, this means that all Member States have access to this same data and so the same detection algorithms can be quickly and easily applied.

**Social Network Analysis**

This is the most useful technique for VAT Carousel fraud, as it is specifically designed to discover the networks of organised crime. As data is ingested, the system automatically builds networks of relationships in the data (e.g. which directors have directorships at other companies; what transactions link different businesses together) where shared details are given such as addresses or telephone numbers (fuzzy matching methods link similar addresses together). It is the ability to apply all of the other hybrid model techniques to these networks in the data that allows the models to detect the truly complex VAT Carousel fraud.

**Automated Business Rules**

The most skilled investigators within the tax authority will have a range of techniques they employ to uncover VAT Carousel fraud. By having an environment in which these can be encoded as business rules that are then automated to run across the entire dataset, it is possible to leverage these precious resources and their expertise.
**Anomaly Detection**

The system can be used to identify businesses that are not behaving in the same way as other businesses within their peer group. For example, this may relate to the types or volumes of transactions in comparison to the employee count. Such anomalies are risk factors and useful ways of discovering new types of fraud modus operandi.

**Predictive Modeling**

When a number of businesses known to be associated with VAT Carousel fraud are identified, these can be used to train models that look at combinations of variables or business rules and then optimise them to best predict that a particular business or network of activity is associated with fraud.

**Text Mining**

Descriptions of transactions may hold clues to the fact that businesses may be involved in fraud, e.g. the particular categories of goods that a business is importing or exporting. Text mining is a technique that allows that information to also be included in detection models.

**The Benefits**

**Detect more fraudulent activity:**
- Increase ROI per investigator, by prioritising higher-value cases and conducting more efficient and accurate investigations.
- Greatly reduce ratio of false positives, enabling up to 80 per cent hit rate (8 out of every 10 alerted cases result in fraud being found).

**Faster detection = decreased fraud losses:**
- Detect VAT Carousels before they happen.
- Discourage fraudsters from trying to commit fraud in the first place.

**Increase efficiency:**
- Reduce time needed for pre-investigation and data preparation (from 3 weeks to 5 minutes).
- Improve investigation efficiency with advanced case management tools (+100 per cent efficiency improvement during investigation).
- Capture the disposition of fraud investigations to fine-tune the detection analytics over time and build a database of known risk factors.
A consolidated view of fraud risk:

The SAS Fraud Framework for Government gives you a consolidated view of fraud risk, enabling you to:

- Improve models on an ongoing basis and continuously adapt the system to address changes in fraud trends.
- Better understand new threats and prevent substantial losses early.

In Belgium, hybrid fraud detection helps recover billions in tax fraud
Yannic Hulot, Director, Belgian Special Tax Inspectorate

In Belgium, the problem of carousel fraud is under control thanks to an advanced analytics technique called hybrid detection. This innovative model uses multiple analytical techniques to expose even the hardest to find fraudsters and, by taking this approach, the Belgian government has reduced fraud losses by 98% and is enjoying savings of nearly 1 billion euro each year.

The agency responsible for combating carousel fraud in Belgium is the Special Tax Inspectorate (ISI), a division of Belgium’s Federal Public Service Finance. Yannic Hulot, ISI Director, recently took the time to explain how carousel fraud has been almost eradicated in Belgium – and how a similar system could be implemented across Europe to get rid of VAT carousel fraud in the broader region.

The problem of VAT carousels is now under control in Belgium. How has this been achieved? Hulot: “The main thing that has helped us eradicate VAT carousels in Belgium is risk analysis using advanced analytics. This allows us to quickly identify companies at risk so we can take action before significant damage is created. And when we know that a 100 million euro case does not require more effort than a 1 million euro case, we will pick the 100 million case – that’s obvious. With the hybrid detection model, we have the tools that are in line with our needs. The results are so good that we can now apply this innovative network approach to some older projects that were carried out using traditional techniques.”

Social network analysis, a technique that investigates the connections in a network, is used in the hybrid detection model. Is it an adequate tool for the detection of VAT carousels? Hulot: “A VAT carousel is nothing more than a network. And for that, social network analysis is the perfect tool. With the amount of data we have from intra-community transactions, company data, unstructured data, etc., we have a cluster of data that is totally unreadable because of the large number of links. The challenge is to extract from this chaos the data that is relevant. This is exactly what we can do with social network analysis, and other methods of the hybrid detection model. But key in all this is to also combine business knowledge during the analysis.”

What is the current situation for the rest of Europe? Hulot: “The situation varies greatly from one country to another. European taxpayers lose billions of euros and this is not widely known. Some member states, and in particular the large countries, have difficulty in managing this mass of information. A solution such as the hybrid detection model is the answer to these problems. It allows you to view the essential, to prioritize cases and then to allocate resources. Today, in the 28 EU member states, the data available for analysis of carousels is the same. This means that the Belgian experience is completely transferable.”
Learn More

SAS is uniquely positioned to support EU tax authorities in their fight against VAT Carousel fraud. The SAS Fraud Framework provides an end to end framework for detecting, preventing and managing all types of VAT fraud and tax evasion. Only SAS combines all of the approaches outlined in this paper in a single integrated solution.

Furthermore, SAS is universally recognised as the worldwide leader of advanced analytics. Only SAS can provide governments with an open, high-performance and scalable solution for implementing analytics as part of an enterprise fraud detection strategy, while also supporting other critical analytical tasks.

To learn more, contact us at fraud.solutions@sas.com
About SAS

SAS is the leader in business analytics software and services, and the largest independent vendor in the business intelligence market. Through innovative solutions delivered within an integrated framework, SAS helps customers at more than 66,000 sites improve performance and deliver value by making better decisions faster. Since 1976 SAS has been giving customers around the world THE POWER TO KNOW®.