

Institution: Nottingham Trent University (NTU)		
Unit of Assessment: C17 – Business and Management Studies		
Title of case study: The modernisation of gambling taxation		
Period when the underpinning research was undertaken: 2000-2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name:	Role:	Period employed by submitting HEI:
Leighton Vaughan Williams	Professor	2000-present
Period when the claimed impact occurred: 2014-2020		
Is this case study continued from a case study submitted in 2014? Y		
1. Summary of the impact NTU has had radical impact on the modernisation of gambling taxation, with tax structure and rates directly informed by NTU research. The resulting Gross Profits Taxation replaced turnover taxation for betting and for gambling machines, leading to near doubling in UK tax revenue in 5 years to c. £3 billion a year, with total machine tax revenue of £3.87 billion collected (95.8% in the current REF period). Other countries, including the USA and Australia, adopted the UK's approach within the same period and uniquely delivered benefits simultaneously to operators, consumers, and exchequer. This resolved key policy tensions between industry and government, enhancing both public and private revenue.		
2. Underpinning research HM Customs & Excise (HMCE) commissioned Vaughan Williams in 2000 to undertake a research project called 'An economic analysis of the options for taxing betting.' The findings demonstrated that a gross profits system of taxation (GPT), in effect taxation based on the stakes placed with betting operators minus winnings paid out, would result in lower prices for consumers and higher turnover for UK betting operators than would the existing tax structure which was levied on bettors' stakes. The new system was shown to be optimal in terms of efficiency, equity, and the long-term protection of tax revenues as the new GPT tax system benefited all key stakeholders – the exchequer, the industry, and consumers (R1, R2). Vaughan Williams was subsequently commissioned by HMRC and the Department for Culture, Media and Sport (DCMS) to lead a research project 'Modelling the UK gambling market.' As part of this he derived estimates of elasticity for different gambling activities, examining the responsiveness of the demand by consumers to changes in price. These estimates have explicitly driven the setting of gambling tax rates before and during the current REF period. His research on the theoretical framework underpinning the switch to the GPT system and gambling machines (i.e. on the responsiveness of tax revenue to tax rates), was a development of work he conducted between 2006 and 2009 for HMRC and was published in 2013 (R3). The work was later extended and expanded, with the switch to gross profits tax on gambling machines, initially in 2013, but followed by tax rate adjustments based on his research in subsequent years (R4, R5). Collectively these research projects evaluated the competition between conventional gaming machines and the relatively new fixed odds betting terminals (FOBTs) and provided empirical		

estimates of the impact of FOBTs on other gambling machines in the UK. There was no significant evidence that FOBTs displaced conventional gaming machines except in licensed betting offices (**R6**).

In 2016, Vaughan Williams produced a further unpublished report commissioned by HMRC, titled 'A Consideration of Fixed Odds Betting Terminals and Part III Machines', which compared structural and functional characteristics of different types of gambling machines, and considered the implications arising from this for tax equivalence and fiscal neutrality for use in the HMRC policy costing model.

Vaughan Williams, Garrett and Paton (2020) and Garrett, Paton and Vaughan Williams (2020) finalise and formalise the theory relating to the responsiveness of tax revenues to tax rates as well as updating the evidence base to cover the period since the end of 2013 (**R4**, **R5**).

3. References to the research

R1. Paton, D., Siegel, D.S. and Vaughan Williams, L., (2002). A policy response to the e-commerce revolution: the case of betting taxation in the UK. *Economic Journal*, 112 (480), pp. 296-314.

R2. Paton, D., Siegel, D.S. and Vaughan Williams, L., (2004). Taxation and the demand for gambling: new evidence from the United Kingdom. *National Tax Journal* 57(4), pp. 847-861.

R3. Vaughan Williams, L. and Paton, D. (2013). The Taxation of Gambling Machines: A theoretical perspective, in Vaughan Williams, L. and Siegel, D.S. (eds.). *The Oxford Handbook of the Economics of Gambling*, Oxford University Press, New York, NY, pp. 692-700.

R4. Vaughan Williams, L., Garrett, T. and Paton, D. (2020). Taxing gambling machines to enhance tourism. *Journal of Gambling Business and Economics*, 13 (2), 83-90.

R5. Garrett, T., Paton, D. and Vaughan Williams, L. (2020). Taxing gambling machines to enhance public and private revenue. *Kyklos*, 73 (4), pp. 500-523.

R6. Paton, D. and Vaughan Williams, L. (2013). Do new gambling products displace old? Evidence from a postcode analysis. *Regional Studies*, 47 (6), pp. 963-973.

The quality of the underpinning research has been evidenced by rigorous externally peer reviewed outputs, both books and articles and by multiple commissions by national and international key stakeholders across the sector.

4. Details of the impact

The HMRC tax model and Machine Games Duty

The introduction of the gross profits tax system for gambling machines in 2013, based on Vaughan Williams' research, has generated significant increases in government tax revenue as well as a marked improvement in industry profitability and viability, the vast majority of which has occurred since August 2013. Sources (**S1**, **S2**, **S3**) confirm that elasticity estimates for gambling provided by Vaughan Williams were used in tax modelling by HM Revenue and Customs.

*"The methodology employed by Professor Leighton Vaughan Williams in his research for HM Revenue & Customs was used explicitly through the HMRC policy costing model in the setting of gambling tax rates during the current REF period" (**S3**).*

*"In a number of sectors such as terrestrial bingo and pools, the only evidence comes from the study underlying the current HMRC model" (Paton and Vaughan Williams, 2005) (**S1** p13).*

These changes led directly to an increase in the number of machines in operation, and a total tax yield from Machine Games Duty between 2013-14 and 2018-19 of £3.87 billion (**S4**). 95.8% of this was collected in the current REF period, including £720 million in 2018-19. For comparison, Amusement Machine Licence Duty in 2012-13 raised £150.8 million.

In this way, the shift to a gross profits system of taxation of gambling machines resolves a key policy tension between industry and government over the sustainability and growth of tax revenues versus industry profitability - namely, the enhancement of both public and private revenue. Notably, and most unusually, the tax changes delivered benefits of major scale simultaneously to operators, consumers, and the exchequer. The HMRC model, and updates of the model on which the tax changes were based, were uniquely informed by Vaughan Williams' work for HMRC and DCMS – (**S1, S2, S3, S5, S6**)

The setting of the level of Machine Games Duty was also based on this model, and related tax policy developments (**S2, S7**), impacting other sectors, were based on the model. It was also used to estimate for policy purposes the likely consequence of subsequent duty changes.

"The sole paper we identified is research carried out by Paton and Vaughan Williams (2005) which implies that the demand for FOBTs is price inelastic (around -0.4) whereas the demand for other gaming machines has an elasticity of around -0.9 in the long run with respect to the tax rate on machines." (**S2**)

The HMRC Principal Research Officer, Megan Gray, states that she can

"... confirm that the research (which utilised your work) was used to update the HMRC's UK gambling model to ensure it reflected the UK gambling market at that time (2014) and was further used to estimate the impact of future duty changes more accurately" (**S5**).

Extension of the gross profits tax system

"Professor Vaughan Williams' research was instrumental in the introduction of the gross profits system of betting taxation in the UK, and the development and expansion of that system of taxation.....In summary, the research undertaken by Professor Vaughan Williams for HMRC and more widely has had a distinct, material and sizeable impact on government tax revenues and industry capacity and viability over the course of the current REF period". (**S3**)

Between the tax year prior to the implementation of this extension in 2014, and 2018-19, general and remote betting duty receipts increased from a total of c. £365 million a year to c. £1.15 billion a year, a total increase of c. £2.4 billion (**S1**). In aggregate, there was a near doubling in tax revenue to c. £3 billion a year.

A gross profits-based system of gambling taxation levied at point of consumption was implemented in South Australia in 2017. They used the research findings of Vaughan Williams, notably on demand elasticities for gambling, in setting rates of betting taxation. (**S8**). The report commissioned by the Department of Treasury and Finance, South Australia states:

"A unit elasticity is a natural prior assumption ... and is also broadly consistent with the estimate of -1.18 in the [Paton and Vaughan Williams] 2005 study ... we believe an elasticity of -1.0 is a reasonable assumption for the elasticity for wagering services in South Australia. We use this as the 'central case' in our modelling."

In 2019, the two most populous Australian states, Victoria and New South Wales, followed South Australia in implementing this system of taxation.

In May 2018, the US Supreme Court declared a national ban on sports betting unconstitutional and a matter for individual states. As of November 2020, legal sports betting became available in 19 states, plus Washington DC (with six more in process) all based on the methodology

employed by Vaughan Williams in his research for HMRC. New entrants have implemented a gross profits system of betting taxation, mirroring the UK, at rates broadly parallel to the rate on sports wagering introduced into the UK. This was noted in a report commissioned in anticipation of the legalisation of sports betting across the USA.

“the UK represents a particularly relevant comparable, with both retail and online gaming, and a tax rate of 15% on GGR” (S9). ‘GGR’ is Gross Gaming Revenue, i.e. Gross Profits.

As an illustration of impact, New Jersey earned c. \$70m and Pennsylvania c. \$52m in new state tax revenue from sports betting from June 2018 to July 2020, from baselines of zero.

5. Sources to corroborate the impact

S1. HM Revenue & Customs. Research Report 313. (2014, see pp. 13, 15, 18). The UK betting and gaming market: price elasticities of demand and use of promotions. Research Report 313. 26 June 2014.

S2. HM Revenue and Customs, Knowledge Analysis and Intelligence (2012). Setting the Rates of Machine Games Duty: Technical Background, Stationery Office, London.

S3. Former Head of Excise & Financial Transactions Policy Analysis, HMRC, dated 23 November 2020.

This confirms the very sizeable national and international impact of the research of Vaughan Williams on the sustainability and growth of government tax revenues and industry capacity and viability over the current REF period. It also confirms policy implementation of the research during the current REF period and was *“explicitly through the HMRC policy costing model in the setting of gambling tax rates during the current REF period”*. Finally, it also confirms the implementation of a major new policy initiative in December 2014, based on research for HMRC by Vaughan Williams

S4. HM Revenue and Customs (2019). Betting and Gaming Bulletin. March, London: HMRC.

This source confirms the huge increase in tax revenue derived from general betting and from gambling machines

S5. HMRC Principal Research Officer email to NTU, dated 13 March 2020

This confirms that Vaughan Williams’ research forms the basis of the HMRC model used in the current REF period.

S6. HM Revenue & Customs Research and Regulations Business Analysis email to Vaughan Williams, dated 30 April 2014.

Confirms that Vaughan Williams’ research forms the basis of the HMRC model used in the current REF period “.

S7. House of Commons Library, 2014, Bingo Taxation 20 June.

Confirms the changes in the rates of Machine Games Duty and bingo duty, based on the HMRC model derived from Vaughan Williams’ research.

S8. University of Adelaide. Betting Operations Tax Revenue Options. Final Report. 2019. Report Commissioned by Department of Treasury & Finance, South Australia.

S9. Oxford Economics (2017). Economic Impact of Legalized Sports Betting. May 2017. Commissioned by the American Gaming Association in anticipation of the legalisation of sports betting across US states.