

## Research Assessment Exercise 2020

### Impact Case Study

University: City University of Hong Kong |  
Unit of Assessment (UoA): 21-Economics and Finance

Title of case study: Risk Modelling for the Hong Kong Banking Industry |

#### (1) Summary of the impact

My research on Finance and Risk has lead to the following impacts:

- Engaged by banks to architect risk models for compliance purposes.
- Establishing CT Risk Solutions, a firm once supported by the CityU incubation center, to develop risk models for the banking industry.
- Establishing CTRISKS Rating, one of the first 5 credit rating agencies licensed in Hong Kong.
- Appointed by professional associations to set standards on professional/licensing examinations.
- Appointed by law firms to support expert witness activities.
- Appointed by HKSAR government to be a member of judge panel of Market Misconduct Tribunal, a court for the securities industry. |

#### (2) Underpinning research

- Research on modelling, measuring and predicting financial risk, such as market risk and credit risk
- Research on financial markets, complex financial products and Basel Committee regulations |

#### (3) References to the research

- i. Cenev, Jovan, Antoni Chan, Humphrey Tung and Michael C S Wong (March 2015) "System and Methods for Optimization of Stochastic Portfolio Mixtures." US Patent Provisionally Filed (Application Number: 62135055), USA [Brief summary: This algorithm integrates various risk measures into a system for portfolio formation.]
- ii. Humphrey Tung and Michael C S Wong (March 2014), "On the Formulation of Credit Barrier Model using Radial Basis Functions." Journal of the Operational Research Society, 65, 1437–1452. [Brief summary: This paper analyses credit migration risk under Basel II with a new quantitative approach.]
- iii. Daning Hu, Leon Zhou, Zhimin Hua and Michael C S Wong (November 2012), "Network-Based Modeling and Analysis of Systemic Risk in Banking Systems", MIS Quarterly, 36, 4, 1269-1291. [Brief summary: This papers analyses systemic risk in global financial networks with network analysis.]
- iv. Wong, Michael C S and Y F Lam (July 2008) "Macro Stress Tests and History-Based Stressed PD: The Case of Hong Kong", Journal of Financial Regulation and Compliance, 16, 3, 251-260. [Brief summary: This paper analyses stress testing results for bank capital requirements under Basel II with different modelling techniques.]

- v. Wong, Michael C S, W Y Cheng and C Y P Wong (2003), "Market Risk Management of Banks: Implications from the Accuracy of Value-at-Risk Forecasts", Journal of Forecasting, Vol. 22, pp. 23-33. [Brief summary: This paper analyses different approaches on Value-at-Risk calculation and discusses their impacts on bank capital requirements under Basel II.]
- vi. Cai, J, Y L Cheung and Wong, Michael C S (2001), "What Moves the Gold Market?" Journal of Futures Markets, Vol. 21, pp. 257-278. [Brief summary: This paper analyses and predicts volatility patterns of the gold market and discuss their implications on market risk forecasting.] |

#### **(4)Details of the impact**

##### 4.1.Basel II Compliance, Credit Risk Modelling and Product Risk Modelling

In 2003, SAS, a global IT and statistics firm, engaged me as lead advisor to develop Basel II internal-ratings-Based (IRB) system for Bank of East Asia in in Hong Kong. The IRB system applied credit risk modelling and model validation techniques to quantify credit risk with probability of default (PD), loss given default (PD) and exposure on default (EAD). This IRB system became the first IRB system approved by the Hong Kong Monetary Authority (HKMA) for bank capital adequacy compliance. In 2007, I set up CT Risk Solutions Ltd with the support of CityU Enterprises Ltd, an incubation arm of CityU. CT Risk Solutions originally focused on credit risk modeling and credit database development for around 5 banks.

In 2008 many banks suffered loss from wealth management services. In 2009, more than 3 banks appointed CT Risk Solutions to re-design their model for customer profiling and their model for investment product risk assessment. The former model involves finance literature review and risk measurement calibration on individual customers. The latter model is a multi-factor model that incorporates various market risks, various credit risks (including counterparty risk), liquidity risk and correlation risk. This model produces value-at-risk of an investment product as a risk measure, efficiently measuring the risk of a wide range of complex products. In 2018, around 30 banks and investment firms from Europe, North America, ASEAN, East Asia and Hong Kong are using the models for their daily business.

##### 4.2.Credit Rating Services

Securities and Futures Commission (SFC) in Hong Kong began to regulate credit rating agencies in 2011. CT Risk Solutions Ltd spun off its quantitative credit rating function to become a separate credit rating agency (CRA), known as CTRISKS Rating. With the approval of CityU, I took up the role of Chairman of the CRA. In June 2011, CTRISKS, S&P, Moody's, Fitch and AM Best were granted CRA license by SFC.

##### 4.3.Manpower Development in the Financial Sector

I served as the founding member of FRM Committee of Global Association of Risk Professionals (GARP) in 1998-2002. The FRM is has consistently regarded to be most

world- recognized qualification on bank risk management. In 2015, the exam has more 40,000 candidates a year. Since 2003, I have served as an examiner of Hong Kong Institute of Bankers to set examination standards on two advanced subjects: “Bank Asset and Liability Management” and “Credit Risk Management”. These two subjects are classified to be Level 6 (Postgraduate Diploma Level). Under the SFC rules, all analysts of SFC-licensed Credit Rating Agencies are required to sit for appropriate examinations operated by Hong Kong Securities and Investment Institute (HKSI). In 2013-2015, HKSI appointed me to be the examiner of “Paper 10: Credit Rating Services”. In 2017, HKSI appointed me to rewrite the study guide for Paper 10. In 2014, both the two financial regulators in Hong Kong, SFC and HKMA, required financial institutions to strengthen the quality of their private banking advisors by passing the examination of “Certified Private Wealth Professionals”, which is organized by both HKSI and HKIB. In 2015, HKSI appointed me to be the examiner on its Module 1 which focuses mainly on investment product knowledge.

#### 4.4. Legal Services on Financial Issues

In 2006-2009, I was engaged by different legal institutions, including Baker & McKenzie, Allen & Overy, and HKSAR Government Department of Justice, to provide expert witness on financial transactions, derivative pricing and asset valuation. In 2015-2016, I was appointed by the HKSAR Government to be a member of Market Misconduct Tribunal (MMT), which is a professional court for the securities industry. In 2016, together with the MMT Chairman (a former judge in Hong Kong) and another MMT member, I handled the case of a US short seller who manipulated the Hong Kong stock market by spreading out misleading information via internet in the USA. MMT confirmed the short seller to be violating Hong Kong laws.

## **(5) Sources to corroborate the impact:**

This pdf file (on p.24) from Institute of Financial Planners of Hong Kong shows my talk in 2009 and my profile associated with CT Risk Solutions:

[http://www.ifphk.org/data/Form/21/CPD%20leaflet\\_090928.pdf](http://www.ifphk.org/data/Form/21/CPD%20leaflet_090928.pdf)

This webpage of CT Risk Solutions show its corporate customers using its risk modelling services:

<http://www.ctrisksoln.com/en/customers/>

This SFC news in 2011 reports that the first 5 CRAs licensed in Hong Kong include CTRISKS Rating, S&P, Moody's, Fitch and AM Best

<https://www.sfc.hk/edistributionWeb/gateway/EN/news-and-announcements/news/doc?refNo=11PR63>

This seminar at Hong Kong General Chamber of Commerce in 2012 shows my backgrounds and affiliation with CTRISKS.

[http://www.chamber.org.hk/en/events/whatson\\_detail.aspx?e\\_code=W120727KF](http://www.chamber.org.hk/en/events/whatson_detail.aspx?e_code=W120727KF)

This seminar at HKICPA in 2014 shows my backgrounds and affiliation with

CTRISKS. [https://www.hkicpa.org.hk/-/media/HKICPA-Website/HKICPA/section4\\_cpd/Continuing-Professinoal-Development-Programme-\(CPD\)/pdf/flyer/2014/mar/s140331s.pdf](https://www.hkicpa.org.hk/-/media/HKICPA-Website/HKICPA/section4_cpd/Continuing-Professinoal-Development-Programme-(CPD)/pdf/flyer/2014/mar/s140331s.pdf)

This newsletter of IAFM in 2005 (in its first para) shows under “GARP Hires New Regional Directors in Toronto and Hong Kong” my appointment as HK regional director of GARP and my previous experience as its FRM Committee member.

[http://www.theiafm.org/publications/118\\_April05.pdf](http://www.theiafm.org/publications/118_April05.pdf)

HKIB Annual Report (2012, p.33) shows my name in its Examination Moderating Committee.

[https://www.hkib.org/pdf/1544420644\\_Talent%20cradle%20for%20half%20a%20century%20Accredited%20qualifications%20to%20drive%20the%20future.pdf](https://www.hkib.org/pdf/1544420644_Talent%20cradle%20for%20half%20a%20century%20Accredited%20qualifications%20to%20drive%20the%20future.pdf)

This SFC announcement in 2016 shows the MMT rulings on Andrew Left.

<https://www.sfc.hk/edistributionWeb/gateway/EN/news-and-announcements/news/doc?refNo=16PR107>

Details of the MMT rulings is located at the link (where my name and signature are

showed at its last page): [http://www.mmt.gov.hk/eng/reports/Evergrande\\_Report.pdf](http://www.mmt.gov.hk/eng/reports/Evergrande_Report.pdf)