Do Higher Civil Servant Salaries Limit Corruption?
Evidence from Hong Kong

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Abstract

We analyse a hand-collected sample of 41,540 corruption complaints by the public that have led to 2,196 prosecutions and 933 convictions of government officials in Hong Kong during 1974-2019. We measure civil service corruption and salaries at the government department level using an unbalanced panel of 90 government departments over 46 years (over 2,649 department-year observations). Our analysis allows us to compare across departments at the same point in time, keeping market-level and time-varying enforcement and institutional factors constant, and controlling for time varying corruption opportunities across departments. We find a strong negative relationship between civil service salaries and corruption, which is robust to different estimation approaches. A roughly 10% increase in salary leads to a 2% reduction in prosecutions, 10-18% reduction in convictions, and 4-5% reduction in aggregate bribe amounts solicited or accepted (1-3 years later). Our more granular data satisfy both the strict enforcement assumptions and the predictions of the theoretical models and controlled laboratory experiments. This may explain the difference with previous studies that use real world data which obtain inconclusive results.

1. Introduction

Does paying civil servants higher salaries prevent them from becoming corrupt? Policymakers have been grappling with this question for at least a thousand years. In 1070s China, chief minister Wang Anshi increased the salaries of government officials in an effort to prevent embezzlement of state funds, and around 200 years later, the Kublai Khan (Emperor Shizu) did the same in order to reduce rampant corruption.[1] In 1868, Hong Kong's Governor MacDonnell *opposed* salary increases for police officers, on the grounds that "it would probably only lead… to the acceptance of bribes in addition to increased salaries."[2] In 1891, Governor Des Voeux identified the low level of salaries (relative to the profits from illegal gambling activities) as a major driving force behind corruption in the police.[3] More recently, Singapore's former Prime Minister Lee Kuan Yew emphasized that paying high salaries to government officials is crucial in ensuring probity in government.[4]

The academic literature on the relationship between salaries and corruption offers equally conflicting results. The theoretical and the experimental literature mostly show that high salaries reduce corruption (see Becker and Stigler (1974) and Cadot (1987)). Under strict penalties that deprive perpetrators of employment and their ill-gotten gains, well-paid civil servants will be unwilling to risk everything by engaging in corrupt activities (the opportunity cost for engaging in such activities increases), thus leading to less corruption. Empirical studies that conduct controlled laboratory experiments under these assumptions have mostly found a negative relationship between wages and corruption (see, for example, Azfar and Nelson, 2007; Armantier and Boly, 2011; and Van Veldhuizen, 2013).

In contrast, studies that use real world within-country or cross-country data produce very inconsistent results that range from a negative relationship between salaries and corruption,[5] to no significant relationship,[6] to a relationship that changes sign according to

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[1] Von Glahn (2016), p 238; Ha (2017)

[2] "Votes and Proceedings of the Legislative Council of Hong Kong," The Hong Kong Government Gazette, Vol XIV, No 43, 3 October 1868

[3] Minutes of the Legislative Council, 5/19 March 1891

[4] "Singapore will remain clean and honest only if honest and able men are willing to fight elections and assume office… If we underpay men of quality as ministers, we cannot expect them to stay long in office… Adequate remuneration is vital for high standards of probity in political leaders and high officials." (Lee, 2000; p 166-167)

[5] Goel and Rich (1989), Goel and Nelson (1998), Chand and Moene (1999), McLeod (2008), Dutt (2009), Le, de Haan and Dietzenbacher (2013), Dong and Torgler (2013), Borcan, Lindahl, and Mitrut (2014), Schulze, Sjahrir and Zakharov (2016), An and Kweon (2017).

[6] Treisman (2000), Rauch and Evans (2000), Panizza (2001), Swamy, Knack, Lee and Azfar (2001), Van Rijckeghem and Weder (2001), Mishra, Subramanian and Topalova (2007), Pellegrini and Gerlagh (2008), Dahlström, Lapuente and Teorell (2012), Alt and Lassen (2014).

circumstances,[7] all the way to a positive relationship (which suggests that corrupt individuals may receive both higher salaries and more bribes).[8] Often different studies offer conflicting results for the same country. The answer to this question has far-reaching public policy implications. If the level of salaries does affect corruption, increasing civil servant salaries can complement other anti-corruption mechanisms that are more difficult to set up.

The reason behind the inconsistent results when using real world data is likely the difficulty in measuring corruption, salaries, opportunities to engage in corrupt activities, and anti-corruption enforcement when comparing across countries, states or provinces (see Section 2, Table 1). First, corruption involves illegal or unauthorized transfers which are undisclosed (Rose-Ackerman, 1975, p. 185). Most previous studies rely on indexes that measure corruption *perceptions* or self-reported questionnaires, and others on indirect measures (such as examination scores or input prices) rather than actual corruption activity. Salary levels are also measured with significant noise as averages at the state/province or country level.

Second, even for studies that compare convictions for corruption across states or provinces, there is variation in how different countries, states or provinces prosecute corruption cases. For example, Goel and Nelson (1998) show that conviction rates for abuse of public office by elected officials vary more than tenfold across U.S. states. It is hard to control for institutional factors, both in cross-country and cross-state/province comparisons.

Third, different occupations in the civil service offer different opportunities for engaging in corrupt activity. Frequent contact with the public (even more so if the contact is with citizens willing to break the law, as in the case of the police or judicial authorities), may offer more opportunities for corruption compared to occupations without such contact. Even different provinces within the same country may have different composition of civil services, for example different proportions of customs, immigration and police officers. Using data from the 2016 U.S. Annual Survey of Public Employment & Payroll (ASPEP) (Kaplan, 2018), we estimate that the proportion of police officers in state/local civil service employment is 2.6 times higher in the District of Columbia (DC) compared to Alaska, and that of judicial and legal employees is 3.5 times higher in Hawaii than in Mississippi or Maine.[9] The composition

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[7] Di Tella and Schargrodsky (2003), Herzfeld and Weiss (2003), Chen and Liu (2018), Demirguc-Kunt, Lokshin and Kolchin (2023).

[8] Karahan, Razzolini, and Shughart II (2006), Gong and Wu (2012), Foltz and Opoku-Agyemang (2015), Navot, Reingewertz and Cohen (2016).

[9] In the U.S., the proportion of police employees in total state/local public employment (measured in full-time equivalent staff) ranges from 3.8% in Alaska to 9.8% in DC. That of judicial and legal employment ranges from 1.4% in Maine and Mississippi to 4.9% in Hawaii. Similar differences are observed across other occupations.

of civil services may depend on state characteristics (more customs officers in provinces with ports, immigration officers in border states, or police officers in metropolitan centres with higher criminality), making opportunities for corruption unequal across states. The probability of observing corruption should be positively related to corruption opportunities in the state's civil service but previous studies lack adequate controls, since these opportunities are difficult to measure.

Finally, the relationship between salaries and corruption may be driven by reverse causality (see Besley and McLaren, 1993; Di Tella, 2001; Graf Lambsdorff, 2005; McLeod, 2008). Corrupt countries (or provinces) may lack resources and thus pay low civil service salaries or they may be paying low salaries deliberately in order to sustain a corrupt bureaucracy. Moreover, the time lag with which political or economic variables affect corruption is unknown (Treisman, 2007). For these reasons, Meyer-Sahling, Mikkelsen and Schuster (2018) suggest that examining the relationship between civil service management practices and corruption requires more granular data at the organizational level.

Our data enable us to tackle better all these measurement issues. We analyse a comprehensive dataset of corruption data obtained from Hong Kong's Independent Commission Against Corruption (ICAC), comprising an unbalanced panel of 90 government departments over 46 years (2,649 department-year observations).[10] These departments have experienced 41,540 corruption complaints by the public, 2,196 prosecutions and 933 convictions of government officials during 1974-2019. In addition, we analyse data from ICAC's 7,129 press releases during 1974-2017 that allows us to obtain dollar amounts for bribes accepted or solicited by civil servants in these departments. By analysing data across what is effectively a large city, we can keep institutional factors and enforcement uniform.

Our data and tests improve on previous studies in three important ways. First, our data is more granular. We analyse four different measures of civil service corruption (complaints, prosecutions, convictions, and bribe amounts). While each of the measures may measure corruption with noise, taken together they provide a very comprehensive picture of corruption activity. Moreover, we measure civil service corruption and civil service salaries at the *government department level*. Our analysis effectively allows us to compare across departments at the same point in time, thus keeping market-level and time-varying enforcement

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[10] See Section for more on Hong Kong's ICAC.

and institutional factors constant. Average salary levels across departments are estimated more accurately by reference to departmental expenses on staff emoluments and staffing levels.

Second, we can control for differences in the opportunities to engage in corrupt activities across departments. The Corruption Prevention Department (CPD) of the ICAC is tasked with providing advice on processes that create opportunities for corruption in order to eliminate such opportunities. This advice may be requested by the department or initiated at the discretion of the ICAC, and reflects the perception of the department's management (or the ICAC) that there may be corruption opportunities. During our sample period the ICAC has conducted 2,476 department-assignments. By measuring these assignment studies, we obtain a very good time-varying control for the opportunities for corruption offered by each department.

Finally, having 46 years of data allows us to estimate more robust specifications that are not possible in previous studies, and we can estimate the lag with which changes in salary affect corruption.

Our results using our more granular data are strongly in line with the laboratory experimental evidence in previous studies, and align with the theoretical predictions of Becker and Stigler (1974) and Cadot (1987). We find a strong negative relationship between civil service salaries and corruption, which is present using all measures of corruption activity, and is robust to different estimation approaches (analysis of levels or percentage changes, percentage deviations from annual average civil service salary, department and year fixed effects, Heckman two-step procedure, co-integrating equations, analysing individual bribery cases, logit models of the likelihood of observing corruption cases, and controls for corruption perceptions, willingness to report corruption, anti-corruption enforcement strength, overall criminality rates, post-secondary education attainment, trade with Mainland China, GDP per capita, and annual GDP growth rates). Our results are economically significant. A 10% increase in average departmental salary leads to a 2% reduction in prosecutions, 10-18% reduction in convictions, and 4-5% reduction in aggregate bribe amounts solicited or accepted by staff in the department (with lags between 1-3 years).

Interestingly, when we analyse different sub-periods, we observe that the negative relationship between salaries and corruption breaks down in the years preceding and those immediately following the return of Hong Kong to China in 1997. While ex post anti-corruption enforcement did not change after 1997, different indicators suggest ex ante public uncertainty leading up to 1997 that it might. The results return to normal when the public

realized that anti-corruption enforcement did not change. This suggests that public perceptions of enforcement may be very significant in driving the relationship between salaries and corruption. This may explain why different studies using real world data find inconclusive results, since anti-corruption enforcement differs across studies.

Our paper contributes to the literature on corruption in several ways. We analyse a comprehensive dataset of direct data on actual corruption activity, and we do not rely on survey data with limited generalizability. Our more granular data, which allows us to compare across departments by keeping enforcement and market factors constant, improves on measurement problems in previous studies that analyse real world data. Possibly due to improved measurement, our results are in line with the theoretical framework of Becker and Stigler (1974) and Cadot (1987), and with the controlled laboratory experimental evidence in previous studies. They contrast with the bulk of real world studies that find inconclusive evidence. Finally, we show that perceived enforcement levels may be a major driver behind the relationship between salaries and corruption.

The remaining of the paper proceeds as follows. The next section reviews the related literature and presents a simple model of corruption. Section 3 discusses the history of corruption in Hong Kong and the institutional environment. Section 4 describes data and variables. Sections 5 and 6 report our main results and robustness tests. Section 7 concludes.

2. Theoretical and empirical literature

The literature on the causes and consequences of corruption identifies several factors which are related to the economic and political environment, enforcement, and culture.[11] However, many of these studies find conflicting results. Furthermore, the majority analyse corruption *perceptions* (rather than actual corruption activity), data from self-reported questionnaire surveys, field experiments or clinical evidence with potentially limited generalizability. When examining the size of the benefits that firms receive in an international sample of actual corruption cases, Cheung, Rau and Stouraitis (2021) find little evidence that many of these institutional factors have an impact on the benefits that corrupt firms receive.

Table 1 reports an extensive list of previous studies that examine the relationship between wages and corruption, and the main characteristics and findings of these studies. We

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[11] For surveys see Bardhan (1997), Jain (2001), Azfar, Lee and Swamy (2001), Svensson (2005), Graf Lambsdorff (2005) or Olken and Pande (2012).

classify them as theoretical and empirical, with the latter divided into studies analysing experimental evidence, real world within-country evidence, cross-country evidence, and country case studies that describe a relationship without reporting formal tests. The theoretical and experimental studies almost overwhelmingly hypothesize/document a *negative* relationship between salaries and corruption. In contrast, studies that analyse within- and cross-country real-world data and case studies provide mixed results.

2.1 The theoretical framework

The theoretical case behind paying high salaries to limit corruption (Panel A) has been articulated by Becker and Stigler (1974), and depends on the severity of enforcement. Assuming that corrupt officials are fired and lose all gains from malfeasance when caught, the optimal wage to deter corruption is inversely related to the probability of detection and directly related to the gain from the corrupt activity. The opportunity cost for well-paid civil servants to engage in corrupt activity (the bar for engaging in such activity) increases when enforcement and penalties result in foregoing their legal income, thus leading to less corruption. Cadot (1987) also shows how higher wages increase the opportunity cost of corruption, thus reducing corrupt behaviour. In contrast, in Barro (1973) and Besley and McLaren (1993) the relationship is sensitive to specific assumptions and conditions. In Sosa (2004) a negative relationship between wages and corruption can only be obtained when the penalties against corrupt officials totally deprive them from receiving their legal income.

In Becker and Stigler's (1974) one-year model,[12] the minimum wage w that a potentially corrupt risk-neutral government official will accept is given by

$$w = pv + (1 - p)(w + b)$$

With probability p the government official is caught and fired. He loses his civil service wage, he has to forfeit the bribe, and has to seek alternative employment at a wage v. With probability $1 - p$ the official is not caught and retains his civil service wages plus the bribe b. Re-arranging, the optimal bribe that the corrupt official may request is

$$b = (w - v)\left[\frac{p}{1 - p}\right]$$

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[12] The model can accommodate more years by incorporating discount rates but this complicates the arithmetic without adding insights about the relationship between wages and corruption.

The higher the opportunity cost of corruption (the wage in government employment w and the probability of enforcement p) the higher the bribe that the corrupt official will solicit.

We extend the model to incorporate a simple decision-making process of the citizen who interacts with the government official following Cadot (1987). We assume that an applicant seeks a permit with intrinsic value X. Applicants face randomly drawn government officials from the population of civil servants and h is the proportion of honest government officials. The expected net benefit U that the applicant will receive is given by

$$U = hX + (1 - h)(X - b)$$

With probability h the applicant will meet an honest official and will receive the permit X without having to pay a bribe. The applicant will meet a corrupt government official with probability $1-h$, in which case she obtains X only after paying a bribe.[13] $1-h$ can also be viewed as a measure of corruption opportunities offered by the government department. X puts an upper limit to the bribe that the corrupt official may request because if $X-b<0$, the citizen is better off not seeking the permit. For simplicity, we assume that both the citizen and the government official know X and h, which is not unreasonable in the real world.

We are interested in how many corrupt acts will take place (the frequency of corruption activity). We assume that the applicant has an unlimited number of permits that could be submitted (or that there are unlimited applicants that apply for permits). Applicant(s) will seek all permits for which $U>0$. Substituting the equation for the magnitude of the bribe, the optimal cutoff intrinsic value of the permit is given by

$$X^* = (1 - h)(w - v)\left[\frac{p}{1 - p}\right]$$

If all government officials are honest ($h=1$), the optimal intrinsic benefit cutoff for applying for a permit will be $X^*=0$. This scenario maximizes the permits that will be sought. As the proportion of corrupt officials $1-h$ increases, with $0<1-h<1$, fewer permits are sought (X^* shifts to the right of its distribution). This is in line with the common view of corruption as

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[13] We assume that the applicant does not face a penalty when caught paying a bribe that has been solicited by the government official, but inferences do not change if she does.

"sand in the machine" that reduces economic activity, since potentially valuable transactions do not take place.[14] X^* reaches its maximum value when all officials are corrupt ($h=0$).

The frequency of corruption activity f will equal all projects whose intrinsic value exceeds X^*, effectively one minus the cumulative distribution function of the distribution of intrinsic permits evaluated at X^*

$$f = 1 - P(X \leq X^*)$$

The intrinsic value of the marginal permit sought is increasing in the wage of the government official w. As the opportunity cost for the government official increases (as the potential loss from getting caught gets higher), the requested bribe increases. It becomes worthwhile for applicants to only seek permits with larger intrinsic value. The X^* shifts to the right of the distribution of potential intrinsic values, and applicants are willing to pay bribes for fewer permits. Only higher-level corruption becomes worthwhile. Low-level corruption is unprofitable, and the frequency of corruption declines as w increases. Strict anti-corruption enforcement increases the opportunity cost of corruption both through larger p and because wages in alternative employment $v=0$ when perpetrators are jailed instead of simply fired.

Cadot (1987) introduces information asymmetry between applicants and government officials about the qualifications of the applicants and about whether they choose to denounce a corrupt official. His model takes a strong penalty approach for malfeasance and assumes that $v=0$. The end result is the same. Higher wages increase the opportunity cost of corruption for the government official, leading to less corruption.

2.2 The empirical literature

In line with the predictions of the theoretical literature, studies that conduct controlled experiments (Panel B), mostly document a negative relationship between wages and corruption. Armantier and Boly (2011) conduct a controlled field experiment in Burkina Faso, and find that offering higher wages to examiners lowered the probability of accepting a bribe. Azfar and Nelson (2007) and Van Veldhuizen (2013) also find an inverse relationship between wages and corruption in laboratory experiments. In other experimental settings, Abbink (2000),

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[14] This literature argues that corruption acts as "sand in the machine" that induces administrative delays (Ades and Di Tella, 1997; Kaufmann and Wei, 2000) or as an arbitrary tax that limits private investment (Murphy, Shleifer and Vishny, 1991; Mauro, 1995; Keefer and Knack, 1995; Mauro, 1997; Lambsdorff, 1999; Wei, 2000).

and Barr, Lindelow and Serneels (2009) find inconclusive results. Most experimental studies are conducted on small sample sizes, which may limit generalizability.

The results of the remaining empirical studies fail to replicate the consistency of the theoretical and experimental studies. Measurement problems and heterogeneity in enforcement may partly explain these conflicting results (as shown before, less anti-corruption enforcement reduces the sensitivity of corruption to wages). Closer to the analysis in this paper are studies that analyse within-country real world data in Panel C. These studies show mixed results that range from a negative to a positive relationship, even when analysing data from the same country. For example, across US states, Goel and Rich (1989) and Goel and Nelson (1998) find that higher salaries discourage corruption, Alt and Lassen (2014) find that relative wages have little impact on corruption, and Karahan, Razzolini and Shughart II (2006) find a positive relationship between corruption and wages.

Most of the studies that find a negative relationship between salaries and corruption suffer from measurement problems. Goel and Rich (1989) analyse a very small sample (39 observations), Dong and Torgler (2013) measure salaries crudely as Gross Regional Product (GRP) per capita across Chinese provinces, Borcan, Lindahl, and Mitrut (2014) analyse examination scores and Di Tella and Schargrodsky (2003) hospital input prices. Such indirect proxies may be driven, for example, by civil servants sticking to regulations more closely when they know that they are under observation, even when there was no corruption involved previously.[15] Most studies measure salaries as averages at the country or province level, with considerable noise. And studies that examine actual corruption activity, examine only one proxy, mostly convictions across provinces in the US and China or complaints across provinces in Russia (Schulze, Sjahrir and Zakharov, 2016). However, as observed by Goel and Nelson (1998), even across U.S. states anti-corruption enforcement differs significantly. Conviction rates for abuse of public office by elected officials vary more than tenfold across U.S. states.

Studies that analyse cross-country data in Panel D mostly offer inconclusive results, but they do not analyse direct measures of corruption. They analyse corruption perceptions (Dutt, 2009; Le, de Haan and Dietzenbacher, 2013; An and Kweon, 2017; Demirguc-Kunt, Lokshin and Kolchin, 2023; Herzfeld and Weiss, 2003; Treisman, 2000; Rauch and Evans, 2000; Panizza, 2001; Swamy, Knack, Lee and Azfar, 2001; Van Rijckeghem and Weder, 2001;

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[15] Initially, the ICAC, received more *non-corruption* than corruption related complaints. Complainants asked the ICAC to forward their grievances to relevant departments. They believed that complaints would be taken more seriously if forwarded by the ICAC, that is, if departments felt that they are being observed by the ICAC.

Pellegrini and Gerlagh, 2008; Dahlström, Lapuente and Teorell, 2012) or attitudes towards corruption (Navot, Reingewertz and Cohen, 2016) obtained from indexes or questionnaires. Salaries are also measured with considerable noise as averages at the country level.

Finally, the case studies in Panel E describe relationships without reporting formal tests. Chand and Moene (1999) describe how increased salaries and anti-corruption enforcement were jointly associated with reduced corruption in tax collection agencies in Ghana. McLeod (2008) discusses how Soeharto's regime in Indonesia offered low salaries in order to make public sector employees financially dependent on corruption. Gong and Wu (2012) describe how convictions for corruption and average salaries increased in tandem in China in the 2000s.

3. Corruption and Institutional Background in Hong Kong

British ships anchored off the island of Hong Kong in 1839, marking the beginning of British colonial administration over the territory. Following the two Opium Wars, the island was ceded to Britain with the Treaty of Nanking (1842), and the Kowloon peninsula was annexed with the Peking Convention (1860). In 1898, the New Territories and several outlying islands were leased for 99 years. In 1984, with the lease expiration approaching, the UK and the People's Republic of China (PRC) signed the Sino-British Declaration, which returned Hong Kong to China upon the expiration of the lease. Since 1997, Hong Kong has been administered as a Special Administrative Region (SAR) of the PRC. Under the *Basic Law*, the constitutional law governing the Hong Kong SAR, it enjoys a high degree of autonomy, with its own currency, Common Law legal system, independent judiciary and press freedom.

Table 2 reports general statistics about Hong Kong. The territory received large influxes of refugees from 1930-1950, following the Japanese invasion and civil war in China. The population doubled again to 7.5 million from 1968-2020. Civil service employment increased from 73,000 to over 177,000 (1967-2020). GDP per capita in constant HK$ increased tenfold during the same period. The city became a major international financial center, serving as a gateway for Chinese companies to raise international capital. Trade with mainland China rose from 11% of Hong Kong's trade to over 50% (1975-2012). The proportion of adults with post-secondary education rose from 5% to over 25% (1990-2020). Overall crime peaked in the mid-

1990s, and has declined since. Currently, Hong Kong ranks among the world's 5-10% countries or territories with the *least* corruption in international rankings.[16]

We discuss the institutional environment behind corruption in Hong Kong in Sections 3.1-3.2 below. In Section 3.3, we discuss how this environment fits the assumptions of the theoretical model described in the previous section.

3.1. Corruption and anti-corruption enforcement in Hong Kong before 1974

Corruption became endemic in Hong Kong from the beginning of British administration. In 1856, the Attorney General charged the Assistant Magistrate with accepting bribes from prisoners for lighter sentences.[17] Illegal gambling, prostitution, drugs, and other unlawful activities were repeatedly identified as drivers of corruption in the police and other government departments.[18] After World War II, fast economic development, a *laissez-faire* attitude, and an influx of refugees (which caused overcrowding and shortages of facilities) generated new sources of corruption. By the early 1970s, corruption permeated all aspects of life, and it was in plain sight. It existed "from womb to tomb."[19] It was both of the one-to-one "satisfied customer" type, and of the "syndicated" type (involving large corruption syndicates). A local saying about the inevitability of corruption also highlighted the futility of expecting a solution: "get on the bus" (accept corruption and join us); "run alongside the bus" (at least do not interfere); but "never stand in front of the bus" (you will be knocked over).[20]

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[16] In 2020, Hong Kong ranked 11th (among 180) in Transparency International's Corruption Perceptions Index, tied with Australia, Canada, and the United Kingdom; 15th (among 185) in the Government Integrity sub-category (which measures corruption in the government sector) of the Index of Economic Freedom compiled by the Heritage Foundation, ahead of Austria, France, Germany, Japan, and the United States; 8th (among 128) in the Absence of Corruption sub-category of the Rule of Law Index compiled by the World Justice Project; and 20th (among 194) in the TRACE Bribery Risk Matrix compiled by TRACE International, ahead of South Korea, the United States, and France. Hong Kong participates in the UN Conventions Against Corruption (UNCAC) and Transnational Organised Crime, and in the Financial Action Task Force on Money Laundering (FATF).

[17] Scott and Gong (2019), pages 30-31

[18] Police ("Votes and Proceedings of the Legislative Council of Hong Kong," *The Hong Kong Government Gazette*, Vol XIII, No 37 (30 August 1867); Welsh (1997), p 279; Minutes of the Legislative Council (5/19 March 1891); Minutes of the Legislative Council (24 October 1912; 26 October 1922; 10 November 1938); Perdue (1940)); Public Works Department (O'Malley, Lister, and Johnson, 1884); immigration services (Correspondence from the Colonial Secretary's Office, *The Hong Kong Government Gazette*, 16 March 1895); various departments (Minutes of the Legislative Council, 8 November 1897); the Sanitary Department (Hewett et al, 1907); ship's officers (Minutes of the Legislative Council, 26 October 1922); import and export duties (Lloyd, 1924, 1926); illegal opium divans (Scott and Gong, 2019, page 35); entry and residence permits (Minutes of the Legislative Council, 28 November 1940); even the removal of human waste buckets from households in urban areas without sewers (Minutes of the Legislative Council, 6 March 1941).

[19] *ICAC Operations Department Report 2004*, page 6

[20] Blair-Kerr (1973b).

Bribery of public officers had been an offence in Hong Kong under English Common Law since 1843. In 1898, the *Misdemeanours Punishment Ordinance* codified related rules, and the 1948 *Prevention of Corruption Ordinance* updated the legal framework based on UK laws. By the late 1960s, however, it was obvious that Hong Kong's legislation was not effective in curbing corruption, and a new *Prevention of Bribery Ordinance* became effective in 1971. Two new statutes greatly facilitated prosecutions and convictions. First, it became an offence for civil servants to possess wealth disproportionate to their official emoluments, with the burden of proof placed on defendants, which allowed convictions even without evidence on specific bribery transactions. Second, the law severed the link between the acceptance of an advantage and a specific corrupt *quid pro quo* action taken as a result. It was enough for prosecutors to prove that the accused had received an advantage without permission.[21]

Corruption was investigated by the police as ordinary crime. In 1952, it established a specialized unit, which in 1971 became the Anti-Corruption Office (ACO) of the police. The *Godber affair* in 1973 proved the major catalyst for change. While under investigation and facing imminent arrest, Peter Fitzroy Godber, Deputy Police Commander of the Kowloon District, used his police-issued pass to bypass immigration controls and escape to London. The investigation uncovered bank deposits in his possession five times larger than his aggregate emoluments in the 20 years he had served in Hong Kong. Godber's abscondment led to public outcry and anti-corruption demonstrations. The recently appointed Governor MacLehose tasked Justice Blair-Kerr with public inquiries about Godber's abscondment and the effectiveness of anti-corruption framework (Blair-Kerr, 1973a; 1973b). One of the issues examined was whether anti-corruption enforcement should remain with the police. Given long-standing public perceptions of police corruption, there were political and psychological arguments in favor of a clean break from the past and the establishment of a new agency.[22]

3.2. The ICAC approach

The *Independent Commission Against Corruption* (ICAC) was established in February 1974, following the enactment of the *Independent Commission Against Corruption Ordinance*. It was an independent agency, not part of the civil service, formally responsible directly to the Governor. The ICAC developed a three-pronged approach to tackle corruption:

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[21] Scott and Gong (2019), pages 16-17, 36-40.
[22] Blair-Kerr (1973b), p 51.

1. The **Operations Department** is tasked with investigating and prosecuting corruption. ICAC investigative officers have the same powers typically observed in police forces and can carry firearms. The ICAC can investigate *all* crimes its investigations uncover, even those that do not directly involve corruption, which offers a better chance of bringing wrongdoers to justice.

2. The **Corruption Prevention Department** conducts "audits" of draft legislation, government departments, public bodies, professional associations or private companies/organizations, in order to identify processes which may be conducive to corruption and make suggestions on how corruption opportunities can be eliminated.

3. The **Community Relations Department** is tasked with educating the public on the evils of corruption using diverse means.

From its establishment, the ICAC gained the trust of the public. Corruption-related complaints *tripled* in the two years following its establishment (Figure 1). The public also channeled a large number of *non-corruption related complaints* through the ICAC (Figure 2). It viewed the new agency as an ombudsman who could help address grievances beyond corruption. Pre-ICAC, two-thirds of corruption complaints were anonymous, as the public worried about retaliation from the perpetrators. By 1980, anonymous complaints made up less than one-third. The percentage of respondents in the ICAC's opinion surveys willing to report corruption increased from around 30% in 1988 to over 80% in 2020 (another 10-20% answered that reporting corruption depended on circumstances). Courts were willing to impose deterrent sentences.[23] Pre-ICAC, between 16-74 persons were prosecuted for corruption annually, and the number increased by 7-8 times during 1974-2019 (Figure 3). By 1988 the majority of corruption complaints involved the private sector as opposed to civil servants (Figure 4).[24]

Anti-corruption laws and ICAC's independence remained unchanged after Hong Kong returned to the PRC, and the ICAC Commissioner became directly responsible to the Chief Executive of the Hong Kong SAR. In ICAC's opinion surveys, the percentage of respondents

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[23] According to Court of Appeal sentencing guidelines: "Where an adult is convicted of an offence against … the Prevention of Bribery Ordinance, an immediate custodial sentence should normally be imposed... Alternative methods of dealing with an offender … should only be imposed in exceptional cases..." (Quoted in ICAC Annual Report 1983). This was in line with public opinion at the time (ICAC Annual Survey 1986). The position was re-affirmed in 2012 (Secretary for Justice v Tang Shu Cheong [2012] 5 HKLRD 458).

[24] In 1983, the ICAC declared that "the 'climate' of corruption has changed radically … The … big syndicates no longer prey on the public… The corrupt now go about their business covertly in fear. The bravado of the early seventies has disappeared." (ICAC Annual Report 1983). Older government officials were gradually retiring. Younger officers, brought up in a corruption conscious society, were less liable to become corrupt. ICAC's efforts shifted towards financial markets fraud, credit card fraud, health insurance fraud, illegal bookmaking syndicates, the construction industry, and publicly listed company directors.

who consider corruption very common in Hong Kong declined from 84% in 1977 to around 25% in 2020, and 98.4% of respondents had not encountered corruption personally.

3.3. The Hong Kong experience and the theoretical models

Pre-1974, the corruption environment in Hong Kong was consistent with the high corruption equilibrium of Akerlof and Yellen (1994) (lack or ineffective enforcement; lack of community engagement in fighting corruption; high community tolerance for corruption; limited cooperation with the police; police procedures that often punished informants; low probability of prosecution; frequent retaliation by corruption syndicates, driven by large profits, side transfers, threats, and repetitive relationships as in Tirole (1986); reduced willingness of the public to supply information). Post-1974, the ICAC approach was in line with the low crime equilibrium in Akerlof and Yellen (1994). Altering public attitudes became as important as strict legal enforcement. The high probability of prosecution increased the public's willingness to lodge corruption complaints. As rewards and retaliation by corruption syndicates diminished, the public became unafraid to cooperate with anti-corruption authorities.

With respect to the theoretical models on the relationship between wages and corruption, the Hong Kong environment post-ICAC fulfilled the basic assumptions of the model in Section 2.1. Enforcement was uniformly strict across time. Penalties were harsh, as the courts handed down deterrent sentences. Corrupt government officials were fired and faced jail time. Corrupt proceeds were confiscated. Following the educational work of the ICAC, the younger generation of government officials became less prone to become corrupt.

4. Data, variables, and descriptive statistics

Our study requires measures of actual corruption activity, average salary, proxies for opportunities for corruption at the department-year level, and other annual economy-wide control variables. We tabulate the sources of data and the definitions of the main variables in Appendix A. Hong Kong was subject to strict lockdowns and quarantines from early 2020 until late 2022, following the onset of the Covid-19 pandemic. Corruption complaints against the public sector declined by almost 35% during 2019-2022, as contact between citizens and the government was reduced. We end our sample in 2019, to avoid the impact of the pandemic.

4.1.Measuring corruption at the departmental level

We analyse four measures of corruption: corruption complaints forwarded to the ICAC by the public or other government bodies, number of persons prosecuted for corruption, number of persons convicted of corruption offences, and aggregate amounts of bribes accepted or solicited. In all cases the perpetrator must be an employee of a government department or other public body/agency. Numbers are aggregated annually by department. For the first three measures, the numbers pertain to the year that the complaint was made, the person was prosecuted or convicted. We obtain annual data on corruption complaints, prosecutions, and convictions, classified by government department, primarily from *ICAC Annual Reports* (1974-2019). For years with missing data, we supplement with figures reported in submissions to Hong Kong's Legislative Council (LegCo) and replies to LegCo questions (1995-2020) (https://www.devb.gov.hk/en/legco_matters/replies_to_legco_questions/index.html).

We obtain data on bribe amounts by analysing the universe of all ICAC's 7,169 press releases during 1974-2017.[25] We first identify press releases that refer to actual corruption cases (approximately 75% of the total), and then whether the receivers of bribes work for one of the government departments in our sample, the amounts paid as bribes, and the *exact year that the bribe was paid* (not the date of the press release). We include only bribes that were solicited or accepted by the government official because we are interested in the decision of the official to become corrupt (we exclude bribes that were offered but were refused).

4.2. Measuring government employee salaries at the departmental level

We estimate average salaries by department by dividing aggregate expenditures on staff emoluments by the number of staff employed by the department. We obtain annual expenditures on staff emoluments for each department and the number of established positions (*establishment*) from the respective *Controlling Officer's Report* in the *Estimates of Revenue and Expenditure* submitted with the Hong Kong SAR Government Budget (1973-2022). Annual departmental expenses on personal emoluments are the sum of reported salaries, allowances, and job related allowances. We obtain historical actual staffing levels (*strength*) from the *Civil Service Bureau*.[26] For departments or agencies that publish annual reports, we obtain emoluments and staffing from their annual reports.[27]

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[25] We thank the ICAC for providing us with the historical press releases that are no longer in the public domain.
[26] We thank the Civil Service Bureau for making the data available to us.
[27] Communications Authority, Companies Registry, ICAC, Hong Kong Monetary Authority, Hong Kong Post, Hospital Authority, Housing Authority, Kowlooon-Canton Railway Company, Land Registry, Legislative Council Commission, Office of The Ombudsman.

The number of staff employed in the department is based on the actual number of staff employed (*strength*). In cases where the actual strength is missing but the number of available positions in the department is available, whether they are filled or not (*establishment*), we estimate staffing by multiplying the establishment figure by the median of the nearest 5 years of available strength-to-establishment ratios for the department in question.[28]

Hong Kong's financial year for budget purposes is from April 1 to March 31 of the following year. When necessary to match such data with series reported on a calendar basis, we match data reported on March 31, with data reported on December 31 of the previous year. For example, budget data reported for fiscal year-end March 31, 2019 are matched with other data reported for calendar year-end December 31, 2018.

Since 1974, civil service salaries in Hong Kong are determined with input from annual pay trend surveys of the private sector matched by salary band and qualifications.[29] While these pay trends may be adjusted for cost of living, economic performance, budgetary and employee morale considerations, large deviations from the survey are rare. Consequently, there is no reason to consider differences between civil service salaries and wages in the private sector, as some studies on corruption do (see, for example, Demirguc-Kunt, Lokshin and Kolchin, 2023).

4.3. Control variables

We control for time-varying differences in the opportunities to engage in corrupt activities across departments by aggregating the number of assignment reports undertaken by ICAC's Corruption Prevention Department (CPD). The CPD provides advice on regulations and processes that create opportunities for corruption, to eliminate such opportunities. The advice may be requested by the department or may be initiated by the ICAC, for example, when it observes significant corruption activity. The advice takes the form of assignment studies (reports) conducted by the CPD. It is possible that a given department may receive more than one such assignments annually, examining different aspects of its operations. These assignment reports are listed in *ICAC Annual Reports*.

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[28] Generally, staff strength across departments in Hong Kong is around 95% of established positions and this percentage does not show significant variation from year to year. Our staffing series consists of 87% observations of actual strength and 13% estimated strength. Our results are qualitatively similar if we use only actual staffing series to estimate average salaries.

[29] These are currently conducted by the Pay Trend Survey Committee (PTSC) of the Standing Commission on Civil Service Salaries and Conditions of Service) (see, for example, the *Brief for the Legislative Council Civil Service Pay Adjustment 2001* (File Ref: CSBCR/PG/4-085-001/23 Pt.3/00), Civil Service Bureau, June 2001 (https://www.csb.gov.hk/english/admin/pay/files/010618_3.pdf).

We also use economy-wide variables obtained from *ICAC Annual Reports*, the *ICAC Mass Survey* (1977-1990) and the *ICAC Annual Survey* (1992-2020),[30] and the *Annual Digest of Statistics* (1967-2021) published by the *Census and Statistics Bureau*. All monetary figures are expressed in constant 2020 HKD using the implied GDP deflator.

4.4. Descriptive statistics

Appendix B reports a list of government departments, agencies, and public bodies, aggregate corruption activity involving their staff, the average number of assignments studies conducted by the ICAC's CPD, and average salary levels. We have data on salaries and corruption for 90 departments, ranked in declining number of corruption complaints. Out of a total of 41,540 corruption complaints, 2,196 corruption-related prosecutions, and 933 convictions during 1974-2019, 58%, 50%, and 45% respectively are recorded by the police, with each of the other departments experiencing significantly fewer cases. Departments that experience more corruption activity also receive more CPD assignment studies. The police have received almost 3 such studies per year, on average, and the Housing Department (with the 2nd highest number of corruption complaints in the sample) almost 4. In contrast, departments that have received few corruption complaints (at the bottom of the table) have received few CPD assignments. The ICAC has conducted 2,476 assignment studies covering the 90 departments in our sample.[31] Departmental salaries show significant variation.

Table 3 shows that the number of departments with both corruption and salary data ranges from a low of 43 (in 1976) to a high of 67 (in 1998-2000), with the median year having data for between 61-62 departments. These numbers are driven by the smaller number of departments with data on salaries.

5. Main results: Departmental corruption and civil service salaries

We first examine the relationship between levels of corruption and salaries, where corruption is measured by complaints, prosecutions and convictions (Section 5.1). Our main

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[30] We thank the ICAC for making the complete opinion surveys available to us. While the ICAC announces a summary of the results, the complete surveys are not in the public domain. In years with missing data we extrapolate the figure to the mid-point of the last available and next available figures. The ICAC conducted its first mass survey in 1977. We use the 1977 figures for 1974-1976.

[31] Whenever a report covers practices in more than one department, it has been assigned to all departments covered. So, this number exceeds the total number of assignment reports listed in the ICAC Annual Reports.

tests estimate Heckman two-stage equations on percentage changes (Section 5.2), and bribe amounts (Section 5.3). We include the police in all remaining specifications.

5.1. Preliminary results: Levels analysis

Table 4 reports preliminary findings on the relationship between corruption levels (complaints, prosecutions, convictions) and salary levels. These specifications follow the specifications on levels of most of the previous literature (see, for example, Goel and Nelson, 1998; Dong and Torgler, 2013; Schulze, Sjahrir and Zakharov, 2016; Chen and Liu, 2018; Alt and Lassen, 2014; Karahan, Razzolini, and Shughart, 2006).

It is the salary prevailing at the beginning of corruption activity that affects the decision to become corrupt (not when the case was prosecuted or convicted) and is relevant for our purposes. Based on our analysis of ICAC press releases, in around 70% of the reported cases, the time lag from the start of the corrupt activity until court proceedings is 3 years. Therefore, we lag salaries by 3 years. We report robustness tests using different lags later.

All specifications control for corruption opportunities and staffing levels. The CPD reports variable, which proxies for corruption opportunities, is the sum of such reports received by the department in the past 5 years, a period which straddles the 3-year lag for salaries. All specifications include department and year fixed effects. Standard errors are heteroscedasticity-consistent and two-way clustered by department and year. These preliminary results on levels exclude the police as an outlier, since it involves more than 50% of the cases in our sample (we include the police in the remaining sections).

Departmental corruption levels are measured per capita (by dividing by departmental staffing) and represent the percentage of the department's employees that engage in corrupt activity. Departmental salaries are measured as percentage deviations from the annual average salary across all departments. Demirguc-Kunt, Lokshin and Kolchin (2023) suggest that wage inequality matters when examining the relationship between salaries and corruption. Our measure also deflates departmental salaries for general increases in real terms over time, and avoids any spurious correlation between time-series increases in prosperity and reduction in corruption activity. In Panel A, departmental complaints, prosecutions and convictions represent annual figures. In Panel B, the corruption variables represent the *sum* of complaints, prosecutions and convictions over the 3-year period following the salary measurement.

We observe a negative and statistically significant relationship between corruption activity and lagged salaries across five of the six columns in the table, both when analysing annual corruption levels (Panel A) and the sum of 3 years of corruption activity (Panel B). In analysis that we do not report for brevity, we obtain qualitatively similar results when we replace year fixed effects with economy-wide control variables. Our preliminary results suggest that departments with higher salaries experience fewer corruption cases, after controlling for departmental corruption opportunities and staffing levels.

Treisman (2007) suggests that one of the problems with the current literature is that it is not known with what lag political or economic variables affect corruption. Table 5 examines the robustness of the results to different lags for the salary measure. It reports the coefficients of the salary variable from the specifications of Table 4, Panel A, for different salary lags (ranging from contemporaneous measures to 5-year lags). Control variables are estimated but not reported. The coefficients of the 3-year lag specifications are identical to those in the first row of Table 4. Coefficients statistically significant at better than the 10% level are highlighted in bold font. We observe negative coefficients between salary and corruption in all 18 specifications, with results stronger for prosecutions and convictions (4 statistically significant lags out of 6 specifications for each). Across all specifications the *p*-values are lower when lagging salaries for 3 years, in line with our expectation from analysing the press releases.

5.2. Heckman two-stage equations of first differences for prosecutions and convictions

It is possible that the previous analysis suffers from selection bias as the sample may not be randomly generated. Some corruption may go undetected, so our dependent variable is only observable for a portion of the data. For example, only cases that have been prosecuted will generate convictions, and most of the cases prosecuted have likely started as complaints. Many corruption cases may go unreported. To address potential sample selection bias, we estimate Heckman two-stage models for prosecutions and convictions.

It is also possible that levels of salaries and corruption activity are both driven by omitted variables. Perhaps civil servants in occupations that pay high salaries may also be more highly educated, and more educated employees may be less prone to become corrupt. Although all our specifications control for corruption opportunities at the departmental level, there may still be omitted variables that our measures do not capture. We address potential omitted variables problems by regressing percentage *changes* in corruption to percentage *changes* in salaries. Given the 3-year lag for salaries used previously, we include two salary change

variables, capturing percentage changes in salaries from t-4 to t-3 and for t-3 to t-2. Changes in corruption are measured from t-1 to t. These and all remaining specifications throughout the paper are estimated on our entire sample, including observations from the police.

The results are reported in Table 6. In the 1st stage (Panel A), we model the likelihood of the department receiving at least one corruption complaint or having at least one prosecution in year t. These specifications include departmental salary levels, the deviation of departmental salaries from average salaries across the entire civil service, our proxy for corruption opportunities, and staffing levels. In addition, we include dummy variables indicating whether the department has received corruption complaints in past years. Moreover, columns 1-2 include economy-wide variables that may have an impact on the likelihood of receiving complaints and conducting prosecutions. These include overall criminality (annual number of non-corruption cases handled by the police), percent of adult population with post-secondary education degrees, GDP growth rate, GDP per capita, trade with Mainland China (as a proportion of total trade), corruption perceptions in society and willingness to report corruption (from ICAC's surveys), and staffing in ICAC investigative roles (from ICAC annual reports) as a proxy for the strength of anti-corruption enforcement. These are lagged for 3 years, following the salary variables. Columns 3-4 include department and year fixed effects without the economy-wide variables. Relative departmental salaries are negatively related to the likelihood of complaints and prosecutions in all 1st stage specifications.

In the 2nd stage (Panel B), we examine the impact of percentage changes in departmental salaries on percentage changes in prosecutions and convictions. These specifications include the usual control for corruption opportunities, in addition to levels of lagged salary, staffing, complaints, prosecutions and convictions. Moreover, columns 1-2 include the economy-wide controls, whereas columns 3-4 include department and year fixed effects. When we examine the economy-wide control variables in columns 1-2, we observe that prosecutions and convictions for corruption are positively correlated with overall (non-corruption) criminality, and with corruption perceptions as reflected in surveys. These results are not surprising.

More importantly, we observe a strong negative relationship between lagged percentage changes in departmental salaries and future percentage changes in prosecutions and convictions across all specifications (in addition, the level of salary is also negatively related to the percentage changes in future convictions). One coefficient is statistically significant at the 10% level and the remaining are close or better than the 1% level. The results suggest that

salary increases lead to less corruption in the future. In addition to being statistically significant, the results are economically significant too. Based on the statistically significant coefficients in the first two rows, a 10% (0.10) increase in salary (0.05 annually), is associated with a 2% reduction in prosecutions and between 10-18% reduction in convictions 3 years later.

One might argue that percentage changes in salary may also be subject to the same omitted variables problem as levels, if employees with the highest salaries also receive the highest salary increases. The Hong Kong SAR government divides civil service salaries into three bands, so in order to examine this possibility we compare adjustments in the high and low band (whenever data for salary adjustment announcements is not available, we compare the adjustments in the highest and lowest Master Pay Scale points).[32] In 12 years during our sample period, the annual percentage salary adjustments were more favourable (larger percentage increases or smaller reductions) to civil servants in the highest salary band, in 8 years they were equal, and in 26 years they were more favourable to civil servants in the lowest salary band. When higher paid civil servants received a higher percentage salary adjustment, this adjustment was, on average, 1.63% higher compared to lower paid civil servants. When lower paid civil servants received a higher percentage salary adjustment, the adjustment was, on average, 3.04% higher compared to higher paid civil servants. Therefore, on average, highly-paid civil servants do not receive larger percentage salary increases. In robustness tests that we do not report in order to economize on space, we include the percentage difference in annual salary adjustment between the highest and lowest salary bands in the specifications of Table 6 but our main results and inferences remain unaffected.

5.3. Heckman two-stage equations of dollar bribe amounts

In Table 7, we analyse the aggregate dollar value of bribes from ICAC's press releases. We aggregate the bribe amounts by department each year. In this case we know the exact date when the bribe was paid, so we can regress *contemporaneous* variables (there is no need to lag salaries, as we did for complaints, prosecutions and convictions, where the date of the corrupt activity was unknown). This analysis may also suffer from selection bias, since for a bribe amount to be recorded in year *t*, there must be at least one active (on-going) corruption case

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[32] Obtained from archived material by the *Civil Service Bureau* (https://www.csb.gov.hk/english/index.html); the *Legislative Council of the Hong Kong Special Administrative Region of the People's Republic of China* committee papers (https://www.legco.gov.hk/en/index.html); the *Joint Secretariat for the Advisory Bodies on Civil Service and Judicial Salaries and Conditions of Service* (https://www.jsscs.gov.hk/en/home/); and the *Association of Government and Technical Survey Officers* (http://www.agtso.org/update/download/MPS-1971-2011%20updated.pdf).

occurring in year *t* that involves departmental staff and has been described in an ICAC press release. We employ again the Heckman two-stage approach, where in the 1st stage (Panel A) we model the likelihood of an active (on-going) corruption case reported in an ICAC press release. In addition to the departmental and economy-wide controls included previously, we include lagged dummy variables that indicate on-going corruption cases in previous years, the number of press releases issued by ICAC in year *t* that pertain to the department and the total number of press releases during the entire sample period involving this department.

Panel B reports coefficients from regressions of average dollar bribe amounts per departmental staff (column 1), per perpetrator involved in the case (column 2), and annual percentage changes in aggregate dollar bribe amounts received by all staff in the department (columns 3-4) on departmental salary levels, deviations from average civil service salary, and percentage changes in departmental salaries from year *t*-1 to *t*.[33] Deviations of the department's salary from average across the civil service is negatively related to dollar bribe per departmental staff and dollar bribe per perpetrator in columns 1-2. Percentage change in salary is also negatively related to percentage change in aggregate dollar bribe amounts received in columns 3-4. All coefficients are statistically significant at better than the 5% level. These results are in line with the results on complaints, prosecutions and convictions. They are also economically significant. On columns 3-4, a 10% increase in salary is associated with a 3.8-4.9% reduction in the aggregate dollar bribe amount accepted or solicited by departmental staff.

In Table 8, we perform a robustness test where we treat each corruption case as an independent observation and estimate a cross-sectional regression of dollar bribe amounts per case and per perpetrator on departmental salary measures. These specifications are similar to Goel and Rich (1989). Both salary levels and deviations from average civil service emoluments are negatively related to dollar bribe amounts (statistically significant at the 5% level or better). In column 5 we add to the sample bribes that were offered but were rejected by the government official. The results are qualitatively similar.

In summary, all specifications show a strong negative relationship between salaries and corruption. Increases in salary are associated with reductions in complaints, prosecutions, convictions or dollar bribe amounts, after controlling for time-varying corruption opportunities across departments, and including year and department fixed effects or economy-wide controls.

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[33] Annual changes in bribe amounts by department can show extreme variations in certain cases (unlike the number of cases in previous specifications). Therefore, we winsorize these percentages at the top and bottom 1%.

6. Robustness tests

We perform several robustness tests. We estimate co-integrating specifications (Section 6.1), we adjust our corruption series for unreported corruption (Section 6.2), we examine how changes in the perception of enforcement affect the results (Section 6.3), we estimate logit models of the likelihood that a department has experienced at least one corruption case during our sample period (Section 6.4), and more (Section 6.5).

6.1. Co-integration

In a few of our preliminary specifications on corruption levels, an Augmented Dickey-Fuller Test rejects the null hypothesis of no co-integration. While our main specifications use annual percentage differences, we also estimate co-integrating equations of levels using fully modified least squares (FMOLS). We include departmental and economy-wide controls. Moreover, as an additional control for any missing long-term trends that may affect both corruption activity and salaries, we include a linear trend in all specifications (our results are even more significant if we drop the linear trend). To economize on space, we report only specifications on convictions. Results on the remaining measures of corruption are qualitatively similar but in a handful of specifications less statistically significant.

The results are reported in Table 9. All specifications show a highly statistically significant negative relationship between departmental salaries and convictions for corruption, which is in line with our main results. The results hold for deviations from average salary across all departments and convictions per staff member (annual convictions as well as the sum for the past 3 years) or annual change in convictions, percentage changes in salary and convictions, and level of salaries and number of convictions expressed in logs. The magnitude of the coefficients is in the same ballpark as in the previous tables and three coefficients are statistically significant at better than the 1% level, whereas two at better than the 5% level. [34] When we examine the economy-wide control variables, overall criminality and public willingness to report corruption are positively related to (reported) corruption activity, whereas the fraction of the population with post-secondary education, GDP growth rate, and GDP per

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[34] For comparison purposes, in specifications where corruption activity is measured by complaints and prosecutions (that we do not report in the table in order to economize on space), the coefficients of the salary variable are -0.0001 (*p*-value 0.000) and -0.0001 (*p*-value 0.115) respectively in specifications of column 1, and -0.0003 (*p*-value 0.856) and -0.0004 (*p*-value 0.062) respectively in specifications of column 2.

capita are negatively related to corruption activity. The latter results suggest that overall economic prosperity is associated with less corruption.

6.2. Adjusting for unreported corruption

Even under strict enforcement, some corruption may remain undetected. Our data likely underrepresent corruption across departments. In this section, we adjust our corruption series for unreported corruption by dividing annually by the percentage of respondents in ICAC's surveys that answer unequivocally that they would report corruption if they encounter it. This adjustment affects mostly intertemporal corruption activity.

These results are reported in Table 10, which shows coefficients from co-integrating regressions of convictions using FMOLS which replicate those in Table 9, columns 1, 3, and 4 above (reported in Table 10, columns 1-3), as well as the 2nd stage response equation from Heckman's two-step procedure which replicates Table 6, column 2 above (reported in Table 10, column 4). The results are qualitatively similar to those reported previously. If anything, the magnitudes of the salary coefficients are larger, and four of the five *p*-values are smaller.

6.3. Changing perceptions of enforcement

The sensitivity of corruption to civil service salary depends on enforcement. Becker and Stigler's (1974) and Cadot's (1987) models are derived under assumptions of strict penalties for corrupt civil servants, and low probability of detection reduces the sensitivity of corruption on salaries. Intuitively, if a civil servant does not worry about detection and penalties, he may opt to receive both a bribe and his salary.

Figures 5-6 report the coefficients of the salary variable in 15-year rolling co-integrating regressions of prosecutions and convictions respectively, in specifications similar to Table 10, column 1 (15 years is the minimum length that allows us to estimate the regressions without dropping explanatory variables or the linear trend; moreover, we cannot estimate the Heckman equations in these sub-samples due to difficulties in maximum likelihood convergence). We show results for the series adjusted for unreported corruption, since they may represent better intertemporal variations in corruption activity, which is what we are trying to analyse here, although the results are qualitatively similar if we use the unadjusted series.

While the results for the entire sample period show negative and statistically significant coefficients, there is a roughly 20-year period from the early 1990s until the late 2000s, where

many of the 15-year regressions show *positive* statistically significant coefficients. Overall, 15-year periods with statistically significant negative coefficients outnumber those with positive by more than 2-to-1 in regressions of convictions, and by more than 6-to-1 in regressions of prosecutions. So, what may explain the "abnormal" results during this particular 20-year period? Hong Kong has practiced a strict enforcement regime with a high probability of detection throughout the 46 years of our sample. However, during the period leading up to the 1997 return of Hong Kong to China, *perceptions* of enforcement may have changed (even if reality did not) and the "abnormal" sub-samples straddle this period.

In retrospect we know that anti-corruption enforcement did not change post-1997. In 1995, the Vice-Director of the Hong Kong and Macau Affairs Office under the State Council of the People's Republic of China, confirmed that the ICAC would continue to operate after the return of Hong Kong to China. Hong Kong's anti-corruption laws remained unchanged. The ICAC's independence was enshrined in Article 57 of the Basic Law, which makes the ICAC Commissioner directly responsible to the Chief Executive of the Hong Kong SAR. We estimate that the ratio of anti-corruption investigative officers in the ICAC per 1,000 civil service staff remained constant at around 4 from 1975-1993. It *increased* steadily thereafter until it reached 6 in 2002, and it has remained at this level subsequently.

Nevertheless, there were worries that in the run-up to 1997, corruption might increase, as some people might attempt to cash-in and escape overseas before the regime change. There was also residual uncertainty about whether the Central government would offer the same support to anti-corruption efforts or that increasing economic links between Hong Kong and the rest of China might provide more opportunities for corruption.[35]

While these fears did not materialize ex post, ex ante *perceptions* of enforcement were affected. In 1992, the ICAC annual survey started asking questions about the impact of 1997 on corruption and the effectiveness of the work of the ICAC. Figure 7 depicts the evolution of responses to four related questions during 1992-2002. Reversing trends in place since the first survey in 1977, public perceptions that ICAC's anti-corruption work was effective dropped by almost 20 percentage points during 1993-2000 (by 2010, confidence in ICAC's work had recovered to 87.4%, higher than the 1993 level). Expectations that corruption would worsen, that confidence in the ICAC's work would weaken, and overall corruption perceptions, exhibit

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[35] Scott and Gong (2019), page 71. Until recently, rulings by courts in Hong Kong were not enforceable in mainland China and vice versa. Corrupt proceeds (and even people) transferred to the mainland might have been beyond the reach of Hong Kong authorities (see Cheung, Rau and Stouraitis, 2006, pages 353-354).

a humped shape during 1992-1996 (but drop significantly afterwards, as these fears did not materialize). The negative relationship between civil service salaries and corruption breaks down during the period of perceived weakness in anti-corruption enforcement.

Perhaps these findings reflect periods of reductions or freezes in civil service salaries, and maybe during these periods the relationship between salaries and corruption is different. Statutory civil service salary scales were reduced or frozen in 1999-2000, 2002-2006, and 2009, corresponding with the periods of world economic downturn in 2000, the severe acute respiratory syndrome (SARS) epidemic, which had a big impact on Hong Kong's economy, and the world financial crisis of 2008-2009 respectively. The average salary across departments estimated in our sample declined in 2000, 2003-2006, and 2008-2009, in line with the government policy on civil service salaries at the time. Since we lag salaries by 3 years, the impact of these salary reductions should be reflected on corruption during 2002-2012. However, in Figures 5-6, regressions starting in 2002 produce *negative* coefficients.

It is more likely that the "abnormal" results reflect the model breaking down during periods of perceived reduction in anti-corruption enforcement. This may also explain why different studies using real world data find inconclusive results, since anti-corruption enforcement differs across studies.

6.4. Likelihood that the department reports at least one corrupt case during 1974-2019

We estimate logit models of the likelihood that the department reports at least one corruption case during 1974-2019. In these logits, all department-year observations are equal to 1 if there's at least one corruption case for the department in question in the entire 46-year sample period (these are different logits than the ones in the 1st stage of the Heckman approach where the department-year dependent variable equals 1 if there are positive corruption cases *in that year*). The results are reported in Table 11. In all specifications (complaints, prosecutions, and convictions), we observe a negative and statistically significant at the 1% level coefficient for the salary variables. Departments where salaries are lower experience at least one corruption case and departments where salaries are higher do not experience corruption cases.

6.5. Other robustness tests

We conduct additional robustness tests that are not reported in tables. First, we express salaries and corruption measures in natural logs. Second, we regress percentage changes in

corruption to percentage changes in salaries without using the Heckman procedure. Third, we estimate co-integrating regressions without economy-wide controls, and using panel dynamic least squares (DOLS). In the case of DOLS, the sample size is reduced significantly because of the need to estimate leads and lags. The negative relationship between salaries and corruption is robust and the results are qualitatively similar to the reported specifications.

Finally, we examine separately the relationship between salaries and corruption in the police, which is an outlier in terms of the number of reported cases. In a few specifications, we also extend our sample period back to 1968, before the establishment of the ICAC, using data from Blair-Kerr (1973b). We obtain a negative relationship between corruption and salaries, but the sample size is small, and the results are sensitive to the control variables that we add.

7. Conclusions

The relationship between civil service salaries and corruption has occupied the minds of policy-makers and academics for a long time. Neither policy nor academia offer conclusive insights. Our study analyses more granular data compared to previous studies, by comparing corruption and salaries across different government departments in Hong Kong, thus keeping institutional, enforcement, cultural and other economy-wide factors constant. Moreover, our data allows us to control for different corruption opportunities offered by different departments.

We find a strong negative relationship between average departmental salaries and four measures for corruption (complaints, prosecutions, convictions, and dollar bribe amounts). The relationship is robust to different specifications. We show that increasing civil servant salaries reduces corruption and the reduction is economically significant. Unlike the inconclusive results in previous studies, our results using more granular data are strongly in line with the predictions of the theoretical literature and controlled laboratory experimental evidence.

During the period of our study, Hong Kong had strict anti-corruption enforcement, straightforward anti-corruption legislation that facilitated the work of prosecutors, and independent (largely non-corrupt) judiciary that was willing to hand down severe punishments to convicted individuals. Corrupt civil servants had a lot to lose if found out. Under these conditions, our results suggest that higher salaries could lead to lower corruption. Tests around 1997 suggest that the relationship may break down when corrupt officials perceive that they are less likely to face repercussions for their corrupt actions. This may explain why different studies using real world data find inconclusive results.

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Table 1: Previous literature on the relationship between salaries and corruption

Study	Country of data	Sample duration	Sample size	Measurement of corruption	Measurement of salary	Relationship between salary and corruption
A. Theoretical						
Becker and Stigler (1974)	n/a	n/a	n/a	n/a	n/a	−
Cadot (1987)	n/a	n/a	n/a	n/a	n/a	−
Barro (1973)	n/a	n/a	n/a	n/a	n/a	− [a]
Besley and McLaren (1993)	n/a	n/a	n/a	n/a	n/a	− [a]
Sosa (2004)	n/a	n/a	n/a	n/a	n/a	−/+ [a]
B. Empirical: Experimental evidence						
Azfar and Nelson (2007)	USA	n/a	96	Bribe amount	Individual wage	−
Armantier and Boly (2011)	Burkina Faso	n/a	247	Bribe amount	Individual wage	−
Van Veldhuizen (2013)	Netherlands	n/a	76	Bribe amount	Individual wage	−
Abbink (2000)	Germany	n/a	24	Bribe amount	Individual wage	No effect
Barr, Lindelow and Serneels (2009)	Ethiopia	n/a	144	Bribe amount	Individual wage	No effect
C. Empirical: Real-world within-country data						
Goel and Rich (1989)	USA	1970-83	39	Convictions	Federal, state, local level	−
Goel and Nelson (1998)	USA	1983-87	50 states	Convictions	Federal, state, local level	−
Dong and Torgler (2013)	China	1998-07	31 provinces	Convictions	Province level (GRP per capita)	−
Borcan, Lindahl, and Mitrut (2014)	Romania	2007-10	850 schools	Exam scores	Country level (public sector)	−
Schulze, Sjahrir and Zakharov (2016)	Russia	2004-13	79 provinces	Complaints	Province level	−
Di Tella and Schargrodsky (2003)	Argentina	1996-97	544	Hospital supplies prices	Individual level (survey)	−/No effect [b]
Chen and Liu (2018)	China	1985-14	30 provinces	Bribe amounts	Province level	U-shaped
Mishra, Subramanian and Topalova (2007)	India	1987-03	328,090	Tariff evasion	Country level (customs staff)	No effect
Alt and Lassen (2014)	USA	1977-03	50 states	Convictions	State level	No effect
Karahan, Razzolini, and Shughart (2006)	USA	1984	82 counties	Convictions	County level (supervisors)	+
Foltz and Opoku-Agyemang (2015)	Ghana	2006-12	47,499	Bribe amounts (survey)	Country level (police)	+
D. Empirical: Real world cross-country data						
Dutt (2009)	Multiple	2000	49 countries	Corruption perceptions	Country level	−
Le, de Haan and Dietzenbacher (2013)	Multiple	1989-00	76 countries	Corruption perceptions	Country level	−
An and Kweon (2017)	Multiple	1999-08	43 countries	Corruption perceptions	Country level	−
Demirguc-Kunt, Lokshin and Kolchin (2023)	Multiple	2000-19	36 countries	Corruption perceptions	Country level	− /+ [c]
Herzfeld and Weiss (2003)	Multiple	1982-97	130 countries	Corruption perceptions	Country level	−/No effect

Treisman (2000)	Multiple	1996-98	36 countries	Corruption perceptions	Country level	No effect
Rauch and Evans (2000)	Multiple	1990	32 countries	Corruption perceptions	Country level	No effect
Panizza (2001)	Multiple	1981-99	27 countries	Corruption perceptions	Country level	No effect
Swamy, Knack, Lee and Azfar (2001)	Multiple	1981-91	93 countries	Corruption perceptions	Country level	No effect
Van Rijckeghem and Weder (2001)	Multiple	1982-94	31 countries	Corruption perceptions	Country level	No effect
Pellegrini and Gerlagh (2008)	Multiple	2004	106 countries	Corruption perceptions	Country level	No effect
Dahlström, Lapuente and Teorell (2012)	Multiple	2008	47 countries	Corruption perceptions	Country level	No effect
Navot, Reingewertz and Cohen (2016)	Multiple	2014	18,800	Attitude towards corruption	Individual level (survey)	+
E. Empirical: Country case studies						
Chand and Moene (1999)	Ghana	1960-94	Case study	Tax revenues/GDP	Country level (tax authority)	−
McLeod (2008)	Indonesia	1968-98	Case study	Public sector budgets	Country level (public sector)	−
Gong and Wu (2012)	China	1999-08	Case study	Convictions	County level	+

Notes:
[a] Under certain conditions
[b] − under a low enforcement regime, no effect under a high enforcement regime
[c] − under low wage inequality, + under high wage inequality

Table 2: Descriptive statistics about Hong Kong

The table reports descriptive statistics about Hong Kong's economy and society. Unless otherwise stated, sources of data appear in Appendix A.

Year	Population	GDP (mil HKD 2020)	GDP growth rate (% average of past 5 years)	GDP per capita (HKD 2020)	Total crime reports to police	Civil service strength	Trade with mainland China as % of Hong Kong's total trade	Population aged over 15 with post-secondary education degree (%)	Newspapers (number)	Corruption Perceptions % (ICAC Survey)	Willingness to Report Corruption % (ICAC Survey)	Transparency International Corruption Perceptions Index Ranking	Heritage Foundation Government Integrity Ranking (sub-category of the Index of Economic Freedom)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1961	3,168,100	108,148		34,137	15,189		11.4	2.2	40				
1965	3,597,900	178,194	13.3	49,527	20,007	72,936 [a]	15.4	2.7	40				
1970	3,959,000	231,713	8.7	58,528	29,052	81,438	8.6	2.6	70				
1975	4,461,600	317,777	14.0	71,225	56,520	104,157	11.0	3.1	107	97.6 [b]	29.6 [b]		
1980	5,063,100	548,447	20.7	108,322	75,754	139,252	10.5	3.4	97	54.5	38.6		
1985	5,456,200	724,438	12.6	132,773	86,944	174,946	25.8	4.2	66	40.7	35.0		
1990	5,704,500	1,051,309	15.6	184,295	88,300	190,448	30.8	5.6	72	42.0	30.7		
1995	6,156,100	1,360,983	11.7	221,079	91,886	182,675	34.8	8.2	59	50.6	61.4	17	1
2000	6,665,000	1,549,017	2.2	232,411	77,245	180,968	38.9	11.4	59	42.1	64.7	15	18
2005	6,813,200	1,904,942	0.8	279,596	77,437	155,019	45.0	15.1	49	29.1	65.3	15	14
2010	7,024,200	2,308,742	4.2	328,684	75,965	156,886	48.9	18.1	46	20.9	75.9	13	12
2015	7,291,300	2,669,732	5.4	366,153	66,439	166,150	51.2	23.3	53	28.1	78.8	18	15
2020	7,474,200	2,675,708	1.6	357,667	63,232	177,327	51.8	25.5	94	25.7	81.7	11	15

Source: *Hong Kong Annual Digest of Statistics* (1947-2022); *ICAC Mass/Annual Surveys* (1977-2020); *Transparency International*; *Heritage Foundation*; [a] data for 1967; [b] data for 1977

Table 3: Department observations by year

The table reports the number of departments with enough data to estimate average departmental salaries and departmental corruption data included in the sample. Sources of departmental salary and corruption data appear in Appendix A.

Year	Department with:			Year	Department with:		
	Salary data	Corruption data	Both		Salary data	Corruption data	Both
1974	45	56	45	1997	61	80	61
1975	44	56	44	1998	67	79	67
1976	43	56	43	1999	67	80	67
1977	44	55	44	2000	67	81	67
1978	46	55	46	2001	65	81	65
1979	45	55	45	2002	59	81	59
1980	46	55	46	2003	62	79	62
1981	46	60	45	2004	64	75	64
1982	50	60	49	2005	65	73	65
1983	47	61	47	2006	65	74	65
1984	47	61	47	2007	65	74	65
1985	44	63	44	2008	65	73	65
1986	50	66	50	2009	65	72	65
1987	50	65	50	2010	65	72	65
1988	50	65	50	2011	65	72	65
1989	53	69	52	2012	65	72	65
1990	57	73	57	2013	65	72	65
1991	57	73	57	2014	65	72	65
1992	58	74	58	2015	65	72	65
1993	58	78	58	2016	65	72	65
1994	60	79	60	2017	65	72	65
1995	62	79	62	2018	65	72	65
1996	63	80	63	2019	65	72	65

Table 4. Departmental salaries and corruption

The table reports preliminary findings on the relationship between corruption levels (complaints, prosecutions, convictions) and salary levels. Departmental corruption levels are measured per capita (by dividing by the staffing level in the department), and departmental salaries are measured as deviations from the average salary across all departments with available data that year. In Panel A, departmental complaints, prosecutions and convictions represent annual figures for the 3rd year following the salary measure. In Panel B, the corruption variables represent the sum of complaints, prosecutions and convictions over the 3 year period following the salary measurement. Salaries are lagged by 3 years. CPD reports represent the sum of such reports received by the department in the past 5 years. All monetary amounts are expressed in constant 2020 Hong Kong dollars. Variables are defined in Appendix A. These specifications exclude the police. Intercepts, year, and department fixed effects are estimated but not reported. *P*-values in parentheses are based on White heteroscedasticity-consistent standard errors two-way clustered by department and year. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Annual Complaints/Prosecutions/Convictions

	[Complaints/Department Staff]$_t$ (1)	[Prosecutions/Department Staff]$_t$ (2)	[Convictions/Department Staff]$_t$ (3)
[Salary/Avg Salary All Depts]$_{t-3}$	-0.0038 (0.009)***	-0.0003 (0.021)**	-0.0002 (0.044)**
Log (CPD Reports) $_{[t-5,t]}$	0.0002 (0.724)	0.0001 (0.110)	0.000 (0.121)
Log (Staffing)$_{t-3}$	-0.0025 (0.053)*	-0.0001 (0.315)	-0.0001 (0.264)
Intercept	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Department Fixed Effects	Yes	Yes	Yes
Obs	1,388	2,351	2,351
Adj. R^2	0.04	0.02	0.01

Panel B. Sum of past 3 years Complaints/Prosecutions/Convictions

	[Complaints/Department Staff] $_{[t-3,t]}$ (1)	[Prosecutions/Department Staff] $_{[t-3,t]}$ (2)	[Convictions/Department Staff] $_{[t-3,t]}$ (3)
[Salary/Avg Salary All Depts]$_{t-3}$	-0.0125 (0.154)	-0.0008 (0.035)**	-0.0004 (0.045)**
Log (CPD Reports) $_{[t-5,t]}$	0.0021 (0.154)	0.0002 (0.036)**	0.0001 (0.107)
Log (Staffing)$_{t-3}$	-0.010 (0.027)**	-0.0003 (0.258)	-0.0002 (0.201)
Intercept	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Department Fixed Effects	Yes	Yes	Yes
Obs	1,281	2,349	2,350
Adj. R^2	0.28	0.12	0.11

Table 5. Lagged effect of departmental salary on corruption

The table reports the coefficients of the salary variable from estimating the specifications of Table 4, Panel A for different salary lags for complaints, prosecutions and convictions (ranging from contemporaneous measures to 5-year lags). Variables are defined in Appendix A. These specifications exclude the police. Control variables, intercepts, year, and department fixed effects are estimated but not reported. *P*-values in parentheses are based on White heteroscedasticity-consistent standard errors two-way clustered by department and year. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

	[Complaints/Department Staff]$_t$ (1)	*[Prosecutions/Department Staff]$_t$* (2)	*[Convictions/Department Staff]$_t$* (3)
[Salary/Avg Salary All Depts]$_t$	-0.000 (0.925)	-0.0002 (0.168)	-0.0001 (0.253)
[Salary/ Avg Salary All Depts]$_{t-1}$	-0.002 (0.403)	**-0.0002 (0.049)****	**-0.0001 (0.085)***
[Salary/ Avg Salary All Depts]$_{t-2}$	-0.003 (0.279)	**-0.0003 (0.062)***	**-0.0001 (0.054)***
[Salary/ Avg Salary All Depts]$_{t-3}$	**-0.0038 (0.009)*****	**-0.0003 (0.021)****	**-0.0002 (0.044)****
[Salary/ Avg Salary All Depts]$_{t-4}$	-0.002 (0.274)	**-0.0003 (0.098)***	**-0.0002 (0.078)***
[Salary/ Avg Salary All Depts]$_{t-5}$	-0.000 (0.966)	-0.000 (0.290)	-0.0001 (0.256)

Table 6. Heckman 2-stage procedure for corruption convictions on 1st differences

This table presents coefficients from regressions using the Heckman two-stage model of percentage changes in departmental corruption complaints, prosecutions and convictions. Panel A reports the results of the 1st stage, where we model the likelihood of complaints and prosecutions. Panel B reports coefficients from regressions of percentage changes in departmental salaries on percentage changes in prosecutions and convictions respectively. Salary variables measure percentage changes in salaries from years t-4 to t-3 and for t-3 to t-2. Changes in corruption are measured from t-1 to t. Variables are defined in Appendix A. Intercepts, year, and department fixed effects are estimated but not reported. Estimates are computed using maximum likelihood. P-values in parentheses are based on Huber-White standard errors. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Stage 1 (Selection equation): Modeling the likelihood of complaints and prosecutions

Dependent Variable: (=1 if cases >0)	Complaints t (1)	Prosecutions t (2)	Prosecutions t (3)	Prosecutions t (4)
Log (Salary)$_{t-3}$	-1.0107 (0.103)	-1.0037 (0.089)*	1.9205 (0.018)**	1.7899 (0.013)**
[Salary/Avg Salary All Depts]$_{t-3}$	0.674 (0.281)	0.3902 (0.522)	-2.3817 (0.009)***	-1.8567 (0.028)**
Log (CPD Reports) [$_{t-5,t}$]	0.3202 (0.000)***	0.4102 (0.000)***	0.1337 (0.090)*	0.0301 (0.774)
Log (Staffing)$_{t-3}$			0.4199 (0.000)***	0.6855 (0.000)***
Complaints $_t$ dummy variable		0.6375 (0.002)***	0.7244 (0.004)***	0.7891 (0.003)***
Complaints $_{t-1}$ dummy variable	1.0263 (0.000)***	0.2138 (0.142)	0.3563 (0.169)	0.5136 (0.067)*
Complaints $_{t-2}$ dummy variable	0.6289 (0.000)***	0.2137 (0.219)	-0.1994 (0.433)	-0.104 (0.675)
Log (Criminality)$_{t-3}$	3.0995 (0.000)***	0.9485 (0.370)		
Post-Secondary Education (%)$_{t-3}$	10.6314 (0.001)***	-1.5147 (0.753)		
GDP Growth Rate$_{t-3}$	0.3690 (0.749)	-2.475 (0.076)*		
Trade with Mainland (%)$_{t-3}$	3.6629 (0.245)	-3.6375 (0.211)		
Log (GDP per capita)$_{t-3}$	-2.9212 (0.000)***	2.4656 (0.008)***		
Corruption Perceptions (%)$_{t-3}$	1.2445 (0.080)*	1.3155 (0.106)		
Willing to Report Corruption(%)$_{t-3}$	1.5480 (0.069)*	0.9926 (0.367)		
Log (Anti-corruption investigative strength) $_{t-3}$	1.8664 (0.000)***	-0.3732 (0.458)		
Intercept	Yes	Yes	Yes	Yes
Year Fixed Effects	No	No	Yes	Yes
Department Fixed Effects	No	No	No	Yes

Panel B. Stage 2 (Response equation): Explaining the number of prosecutions and convictions

Dependent variable:	Δ (Prosecutions)[t-1,t] (%) (1)	Δ (Convictions)[t-1,t] (%) (2)	Δ (Convictions)[t-1,t] (%) (3)	Δ (Convictions)[t-1,t] (%) (4)
Δ (Salary) [t-4,t-3](%)	-0.3738 (0.308)	-1.7287 (0.048)**	-1.957 (0.010)***	-1.9498 (0.011)**
Δ (Salary) [t-3,t-2](%)	-0.3870 (0.066)*	-1.9007 (0.066)*	0.4632 (0.759)	0.4364 (0.774)
Log (Salary)t-4	-0.3560 (0.129)	-1.3444 (0.014)**	-1.1441 (0.003)***	-1.1283 (0.003)***
Log (CPD Reports) [t-5,t]	0.1000 (0.302)	0.171 (0.196)	-0.3726 (0.003)***	-0.3609 (0.004)***
Log (Staffing)t-3	0.1190 (0.036)**	-0.0046 (0.971)	-0.0723 (0.629)	-0.0675 (0.677)
Log (Complaints)t-1	0.3408 (0.000)***	0.3664 (0.000)***	0.3675 (0.001)***	0.3672 (0.001)***
Log (Prosecutions)t-1	-0.6806 (0.000)***	-0.0627 (0.688)	-0.1936 (0.296)	-0.1944 (0.294)
Log (Convictions)t-1		-0.8092 (0.000)***	-0.7707 (0.001)***	-0.7703 (0.001)***
Log (Criminality)t-3	2.0249 (0.018)**	4.5628 (0.034)**		
Post-Secondary Education (%)t-3	2.6566 (0.483)	3.989 (0.628)		
GDP Growth Ratet-3	0.6939 (0.488)	-3.4962 (0.135)		
Trade with Mainland (%)t-3	1.0161 (0.730)	-5.2351 (0.259)		
Log (GDP per capita)t-3	-1.3686 (0.299)	2.3483 (0.146)		
Corruption Perceptions (%)t-3	1.0861 (0.024)**	2.8226 (0.058)*		
Willing to Report Corruption(%)t-3	1.0681 (0.164)	1.2742 (0.461)		
Log (Anti-corruption investigative strength) t-3	1.2581 (0.191)	-1.0525 (0.282)		
Intercept	Yes	Yes	Yes	Yes
Year Fixed Effects	No	No	Yes	Yes
Department Fixed Effects	No	Yes	Yes	Yes
Obs	1,136	1,166	1,169	1,169

Table 7. Heckman 2-stage procedure for $ bribe amounts

This table presents coefficients from regressions using the Heckman two-stage model of levels and percentage changes in departmental dollar bribe amounts received or solicited. Panel A reports the results of the 1st stage, where we model the likelihood of an on-going corruption case in the department reflected in press releases. *Active Case* is a dummy variable indicating that there is at least one on-going corruption case in the department in year *t* that has been reported in ICAC press releases. Panel B reports coefficients from regressions of dollar bribe amounts per departmental staff (column 1), dollar bribe amounts per perpetrator involved in the case (column 2), and percentage changes in aggregate dollar bribe amounts received by all departmental staff (columns 3-4) on departmental salary levels, deviations from average civil service salary, and percentage changes in departmental salaries. Salary change variables measure percentage changes in salaries from year *t*-1 to *t*. Changes in dollar bribe amounts are measured from *t*-1 to *t*. Variables are defined in Appendix A. All amounts have been converted to constant 2020 HKD. Dollar bribe change percentages have been winsorized at the top and bottom 1%. Intercepts, year, and department fixed effects are estimated but not reported. Estimates are computed using maximum likelihood. *P*-values in parentheses are based on Huber-White standard errors. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Stage 1 (Selection equation): Modeling the likelihood of an active corruption case reported in the press

Dependent Variable: (=1 if active cases reported in press releases implicating the department that year >0)	Active Case *t* dummy variable (1)	Active Case *t* dummy variable (2)	Active Case *t* dummy variable (3)	Active Case *t* dummy variable (3)
Log (Salary)$_t$	-0.3009 (0.625)	-0.2959 (0.633)	2.6019 (0.016)**	-1.1464 (0.096)*
[Salary/Avg Salary All Depts]$_t$	-0.558 (0.448)	-0.5675 (0.443)	-3.5701 (0.003)***	0.2262 (0.740)
Log (CPD Reports) [$_{t-5,t}$]	-0.0019 (0.982)	-0.0018 (0.983)	0.1302 (0.075)*	0.0507 (0.513)
Log (Staffing)$_t$	0.1934 (0.023)**	0.192 (0.024)**	0.0405 (0.564)	0.1915 (0.021)**
Active Case $_{t-1}$ dummy variable	1.6267 (0.000)***	1.6232 (0.000)***	1.5944 (0.000)***	1.5388 (0.000)***
Active Case $_{t-2}$ dummy variable	-0.1912 (0.211)	-0.1895 (0.218)	-0.2205 (0.093)*	-0.1977 (0.090)*
Active Case $_{t-3}$ dummy variable	0.2199 (0.111)	0.2247 (0.102)	0.2746 (0.004)***	0.1886 (0.061)*
Press Releases $_t$	0.0861 (0.376)	0.0875 (0.371)	0.1799 (0.010)**	0.1859 (0.014)**
Press Releases (Total)	0.6023 (0.000)***	0.6057 (0.000)***	0.3618 (0.000)***	0.5186 (0.000)***
Log (Criminality)$_t$				-0.2665 (0.690)
Post-Secondary Education (%)$_t$				-11.5942 (0.000)***
GDP Growth Rate$_{t-3}$				-0.7992 (0.544)
Trade with Mainland (%)$_t$				8.8129 (0.034)**
Log (GDP per capita)$_t$				-1.5373 (0.116)
Corruption Perceptions (%)$_t$				-0.3822 (0.512)
Willingness to Report Corruption(%)$_t$				1.3967 (0.046)**
Log (Anti-corruption investigative strength)$_t$				1.9236 (0.028)**
Intercept	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	No
Department Fixed Effects	Yes	Yes	Yes	Yes

Panel B. Stage 2 (Response equation): Explaining the $ amount of bribes

Dependent variable:	Log ($Bribes/Staffing)$_t$ (1)	Log ($Bribes/Acceptor)$_t$ (2)	Δ ($Bribes) $[t-1,t]$(%) (3)	Δ ($Bribes) $[t-1,t]$(%) (4)
Log (Salary)$_t$	0.6735 (0.172)	0.5041 (0.693)		
[Salary/Avg Salary All Depts]$_t$	-2.2305 (0.022)**	-4.976 (0.044)**		
Δ (Salary) $[t-1,t]$(%)			-0.4931 (0.024)**	-0.3801 (0.031)**
Log (Salary)$_{t-1}$			-0.5734 (0.173)	-0.3279 (0.325)
Log (CPD Reports)$[t-5,t]$	0.2097 (0.270)	0.8024 (0.105)	0.0365 (0.615)	0.0606 (0.388)
Log (Staffing)$_{t-1}$	0.5266 (0.004)***	1.8156 (0.000)***	0.0437 (0.533)	0.0343 (0.647)
Log (Criminality)$_t$				-0.9436 (0.072)*
Post-Secondary Education (%)$_t$				-5.3799 (0.016)**
GDP Growth Rate$_{t-3}$				0.8225 (0.411)
Trade with Mainland (%)$_t$				3.6161 (0.257)
Log (GDP per capita)$_t$				-0.4648 (0.553)
Corruption Perceptions (%)$_t$				0.0828 (0.858)
Willingness to Report Corruption(%)$_t$				0.3962 (0.456)
Log (Anti-corruption investigative strength)$_t$				0.5656 (0.439)
Intercept	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	No
Department Fixed Effects	Yes	Yes	Yes	Yes
Obs	2,291	2,306	2,284	2,284

Table 8. Analyzing $ bribe amounts for individual bribe cases

This table presents coefficients from regressions of $ bribe amounts on salaries for individual bribe incidents (as opposed to annual totals). Columns 1-4 include only bribes that were actually solicited or accepted. The sample in Column 5 also includes bribes that were offered but were not accepted by the government official. All other variables are defined in Appendix A. Intercepts, year, and department fixed effects are estimated but not reported. *P*-values in parentheses are based on heteroscedasticity-consistent standard errors clustered by year. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable:	Log ($Bribe)$_t$	Log ($Bribe)$_t$	Log ($Bribes/Acceptor)$_t$	Log ($Bribes/Acceptor)$_t$	Log ($Bribes/Acceptor)$_t$
	(1)	(2)	(3)	(4)	(5)
Log (Salary)$_t$	-1.7735 (0.007)***		-1.9954 (0.003)***		
[Salary/Avg Salary All Depts]$_t$		-2.6128 (0.059)*		-2.8821 (0.038)**	-2.7531 (0.044)**
Log (CPD Reports)[t-5,t]	-0.2485 (0.409)	-0.2994 (0.255)	-0.2377 (0.435)	-0.2982 (0.260)	-0.1274 (0.666)
Log (Staffing)$_t$	0.226 (0.590)	0.1854 (0.597)	0.1985 (0.633)	0.1569 (0.648)	0.0295 (0.942)
Number of Acceptors	0.2843 (0.000)***	0.2849 (0.000)***			
Intercept	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Department Fixed Effects	Yes	Yes	Yes	Yes	Yes
Obs	554	554	554	554	564
Adj. R^2	0.34	0.34	0.32	0.32	0.29

Table 9. Estimating co-integrating equations

This table presents coefficients from co-integrating regressions using Fully Modified Least Squares (FMOLS) estimation of corruption convictions on salaries. Column 1 regresses level convictions per staff, column 2 cumulative convictions per staff for the past 3 years, columns 3-4 percentage changes in convictions, and column 5 the natural logarithm of the number of convictions. All variables are defined in Appendix A. Intercepts and a linear trend are estimated but not reported. Coefficient co-variances are computed using the sandwich method. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

	$[Convictions/Staff]_t$ (1)	$[Convictions/Staff]_{[t-3,t]}$ (2)	$\Delta\ Convictions_{[t-1,t]}(\%)$ (3)	$\Delta\ Convictions_{[t-1,t]}(\%)$ (4)	$Log\ (Convictions)_t$ (5)
$[Salary/Avg\ Salary\ All\ Depts]_{t-3}$	-0.0002 (0.006)***	-0.0005 (0.000)***	-0.1171 (0.022)**		
$\Delta\ (Salary)_{[t-4,t-3]}(\%)$				-0.0315 (0.487)	
$\Delta\ (Salary)_{[t-3,t-2]}(\%)$				-0.0936 (0.048)**	
$Log\ (Salary)_{t-3}$					-0.1048 (0.002)***
$Log\ (CPD\ Reports)_{[t-5,t]}$	0.000 (0.236)	0.0000 (0.470)	0.0011 (0.951)	-0.0019 (0.921)	-0.0026 (0.746)
$Log\ (Staffing)_{t-3}$	0.000 (0.361)	-0.0004 (0.000)***	-0.0461 (0.100)*	-0.0042 (0.866)	-0.0397 (0.004)***
$Log\ (Criminality)_{t-3}$	0.0002 (0.061)*	0.0001 (0.654)	0.1854 (0.051)*	0.2000 (0.045)**	0.0741 (0.100)*
Post-Secondary Education (%)$_{t-3}$	-0.0010 (0.681)	0.0080 (0.165)	1.6656 (0.424)	-0.9642 (0.639)	-2.0594 (0.044)**
GDP Growth Rate $_{t-3}$	-0.0003 (0.122)	0.0002 (0.710)	-0.7899 (0.000)***	-0.6598 (0.001)***	-0.2145 (0.016)**
Trade with Mainland/Trade Total (%)$_{t-3}$	-0.0006 (0.482)	0.0041 (0.030)**	0.1675 (0.812)	-0.4846 (0.547)	-0.4454 (0.173)
$Log\ (GDP\ per\ capita)_{t-3}$	-0.0005 (0.007)***	-0.0013 (0.002)***	0.1477 (0.298)	-0.0575 (0.712)	-0.2829 (0.000)***
Corruption Perceptions (%)$_{t-3}$	0.000 (0.738)	0.0000 (0.909)	-0.0415 (0.586)	0.0130 (0.862)	0.0542 (0.120)
Willingness to Report Corruption (%)$_{t-3}$	0.0003 (0.039)**	0.0008 (0.009)***	0.2534 (0.030)**	0.1443 (0.219)	0.0662 (0.227)
$Log\ (Anti\text{-}corruption\ investigative\ strength)_{t-3}$	-0.0001 (0.593)	0.0009 (0.099)*	-0.0594 (0.750)	-0.1797 (0.370)	-0.0509 (0.557)
Intercept	Yes	Yes	Yes	Yes	Yes
Linear trend	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	No
Department Fixed Effects	No	No	No	No	No
Obs	1,877	1,877	1,878	1,781	1,878
Adj R^2	0.02	0.22	-0.08	-0.08	0.62

Table 10. Adjusting for unreported corruption

The table presents coefficients from co-integrating regressions using Fully Modified Least Squares (FMOLS) as in Table 9, columns 1, 3, and 4 (reported in columns 1-3) and the 2nd stage response equation from Heckman's two-step procedure as in Table 6, column 2 (reported in column 4) of levels of convictions and changes in convictions on salaries, after adjusting the convictions series for unreported corruption by dividing by willingness to report corruption from annual surveys. All variables are defined in Appendix A. Intercepts and a linear trend (columns 1-3) are estimated but not reported. Coefficient co-variances are computed using the sandwich method (columns 1-3) and the Huber-White method (column 4). *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

	Fully Modified Least Squares (co-integrating)			Heckman (2nd stage response equation)
	[Convictions/Staff]$_t$ (adjusted) (1)	Δ Convictions $_{[t-1,t]}$ (%) (adjusted) (2)	Δ Convictions $_{[t-1,t]}$ (%) (adjusted) (3)	Δ Convictions $_{[t-1,t]}$ (%) (adjusted) (4)
[Salary/Avg Salary All Depts]$_{t-3}$	-0.0005 (0.001)***	-0.1387 (0.008)***		
Δ (Salary) $_{[t-4,t-3]}$(%)			-0.0208 (0.653)	-1.2853 (0.160)
Δ (Salary) $_{[t-3,t-2]}$(%)			-0.1756 (0.000)***	-2.1884 (0.047)**
Log (Salary)$_{t-4}$				-0.6024 (0.382)
Log (Complaints)$_{t-1}$				0.3299 (0.005)***
Log (Prosecutions)$_{t-1}$				0.188 (0.290)
Log (Convictions)$_{t-1}$				-1.2439 (0.000)***
Log (CPD Reports)$_{[t-5,t]}$	-0.0001 (0.029)**	0.0011 (0.955)	0.0011 (0.954)	-0.3062 (0.091)*
Log (Staffing)$_{t-3}$	-0.0002 (0.113)	-0.0289 (0.308)	0.0228 (0.361)	0.0035 (0.981)
Log (Criminality) $_{t-3}$	0.0002 (0.296)	0.1007 (0.295)	0.0789 (0.438)	3.4368 (0.014)**
Post-Secondary Education (%)$_{t-3}$	-0.0006 (0.892)	6.4154 (0.002)***	2.8390 (0.176)	-2.7854 (0.658)
GDP Growth Rate $_{t-3}$	-0.0012 (0.006)***	-0.7316 (0.000)***	-0.7475 (0.000)***	-5.2826 (0.005)***
Trade with Mainland/Trade Total (%)$_{t-3}$	-0.0004 (0.807)	1.0375 (0.146)	0.0735 (0.929)	-7.0198 (0.081)*
Log (GDP per capita) $_{t-3}$	-0.001 (0.003)***	0.2956 (0.040)**	0.0976 (0.539)	1.7743 (0.188)
Corruption Perceptions (%)$_{t-3}$	-0.0004 (0.038)**	-0.4308 (0.000)***	-0.388 (0.000)***	1.9416 (0.053)*
Willingness to Report Corruption (%)$_{t-3}$	0.0007 (0.013)**	1.2073 (0.000)***	1.0577 (0.000)***	3.1538 (0.029)**
Log (Anti-corruption investigative strength) $_{t-3}$	-0.0005 (0.214)	0.0817 (0.665)	-0.1451 (0.477)	-0.7654 (0.355)
Intercept	Yes	Yes	Yes	Yes
Linear trend	Yes	Yes	Yes	No
Year Fixed Effects	No	No	No	No
Department Fixed Effects	No	No	No	Yes
Obs	1,877	1,878	1,781	1,166
Adj R²	0.05	-0.07	-0.07	

Table 11. Logit of the likelihood that a department has at least 1 corruption case 1974-2019

This table reports coefficients from logit models of the likelihood that the department has experienced at least one corruption case in the entire 1974-2019 period. In these logits, all department-year observations are equal to 1 if there's at least one corruption case for the department in question in the entire 46 year sample period. Column 1 analyses corruption complaints, Column 2 prosecutions, and Column 3 convictions. All variables are defined in Appendix A. Intercepts are estimated but not reported. *P*-values in parentheses are based on finite sample-adjusted cluster-robust standard errors and covariances. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

	Complaints (1)	Prosecutions (2)	Convictions (3)
[Salary/Avg Salary All Depts]$_{t-3}$	-1.2995 (0.001)***	-1.3387 (0.000)***	-1.8633 (0.000)***
Log (CPD Reports)[$_{t-5,t}$]	2.5246 (0.000)***	1.0135 (0.000)***	1.2764 (0.000)***
Log (Staffing)$_{t-3}$	0.6894 (0.000)***	1.0226 (0.000)***	1.1425 (0.000)***
Log (Criminality) $_{t-3}$	1.5729 (0.001)***	0.7919 (0.006)***	0.6022 (0.079)*
Post-Secondary Education (%)$_{t-3}$	7.411 (0.000)***	3.6471 (0.001)***	0.2403 (0.866)
GDP Growth Rate $_{t-3}$	1.5251 (0.157)	0.0767 (0.903)	-0.6774 (0.326)
Trade with Mainland/Trade Total (%)$_{t-3}$	-4.5758 (0.027)**	-5.3794 (0.001)***	-6.3449 (0.001)***
Log (GDP per capita) $_{t-3}$	0.7398 (0.229)	1.0264 (0.050)**	1.6162 (0.006)***
Corruption Perceptions (%)$_{t-3}$	-0.9979 (0.007)***	-0.5507 (0.007)***	-0.6154 (0.016)**
Willingness to Report Corruption (%)$_{t-3}$	-3.0095 (0.000)***	-1.6346 (0.000)***	-1.4234 (0.000)***
Log (Anti-corruption investigative strength) $_{t-3}$	-0.9091 (0.008)***	-0.9678 (0.009)***	-1.1042 (0.003)***
Intercept	Yes	Yes	Yes
Year Fixed Effects	No	No	No
Department Fixed Effects	No	No	No
Obs	2,398	2,398	2,398
MsFadden R²	0.35	0.44	0.52

Figure 1: Number of corruption complaints received by the ICAC
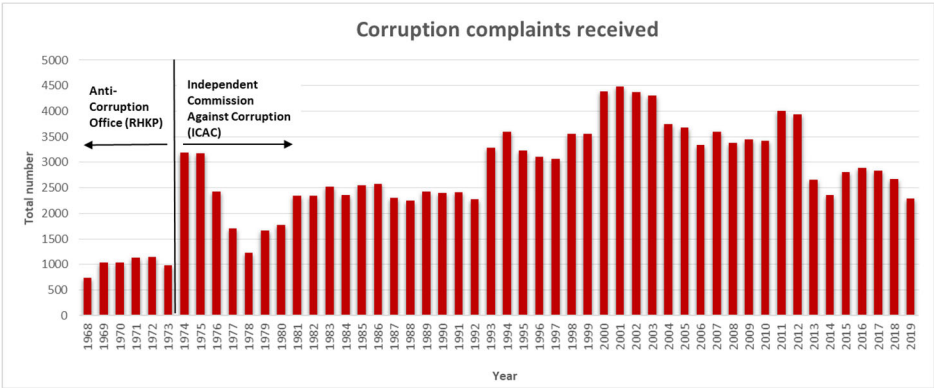

Figure 2: Number of complaints received not reporting corruption
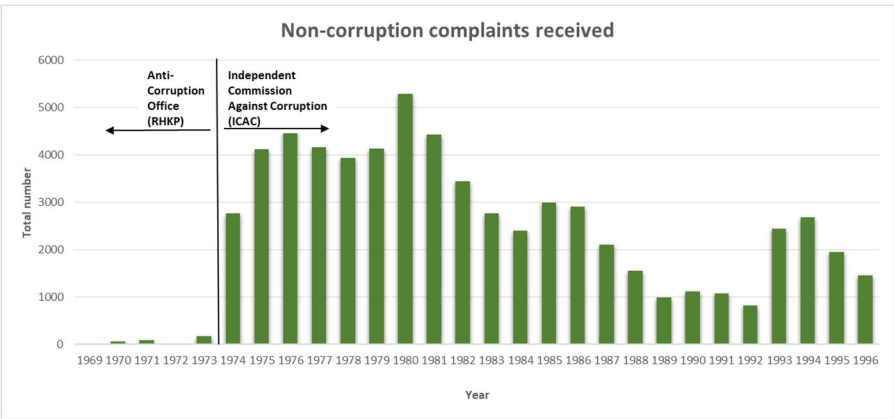

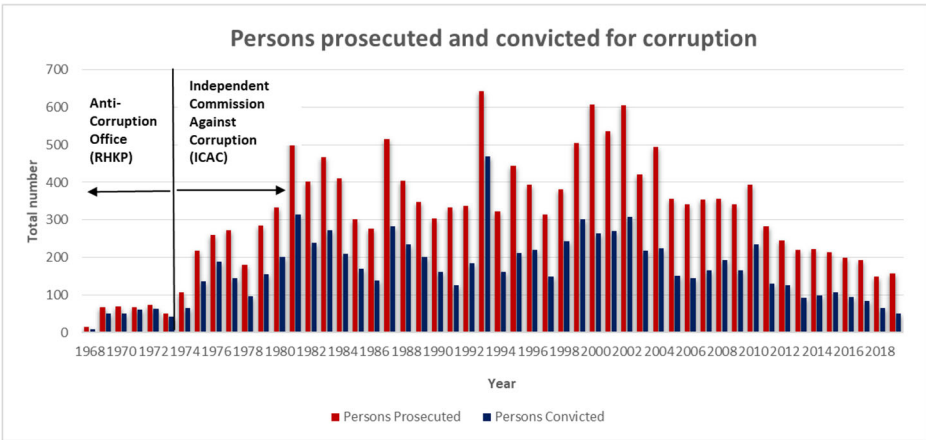**Figure 3: Number of persons prosecuted and convicted for corruption**

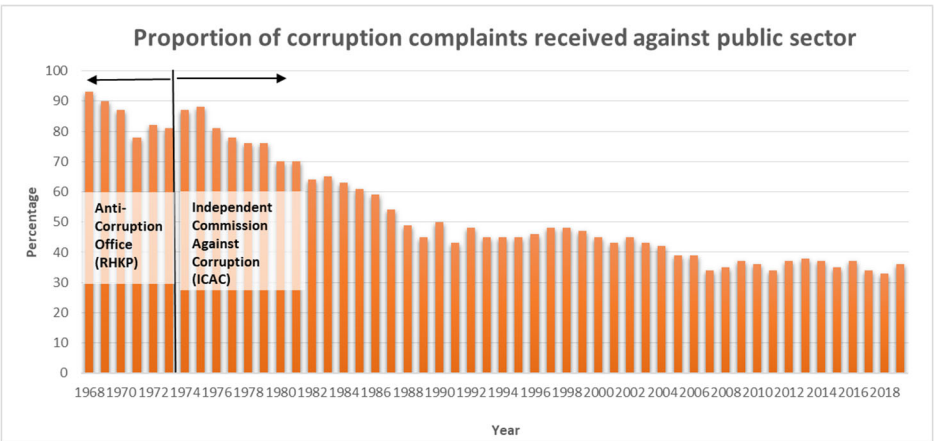**Figure 4: Corruption complaints received against public sector (%)**

Source: Blair-Kerr (1973b); *ICAC Annual Reports* (1974-2019)

Figure 5

Coefficients of salary in 15-year rolling regressions of prosecutions

Figure 6

Coefficients of salary in 15-year rolling regressions of convictions
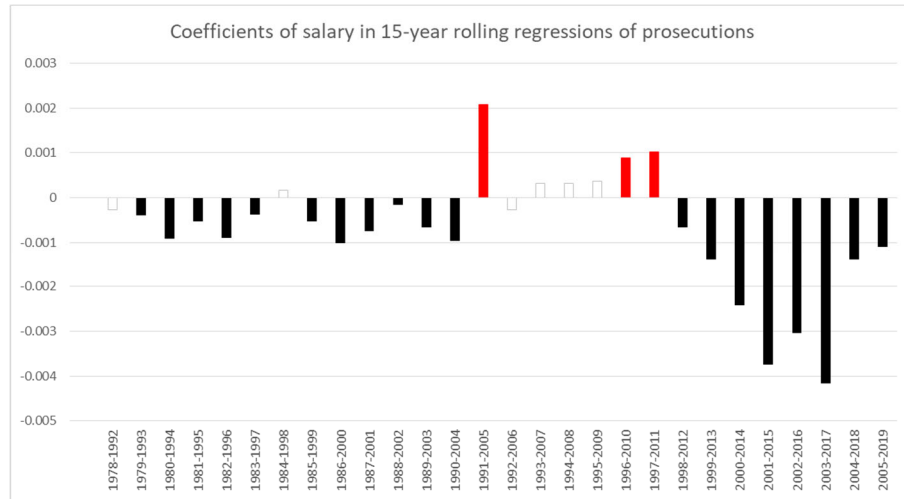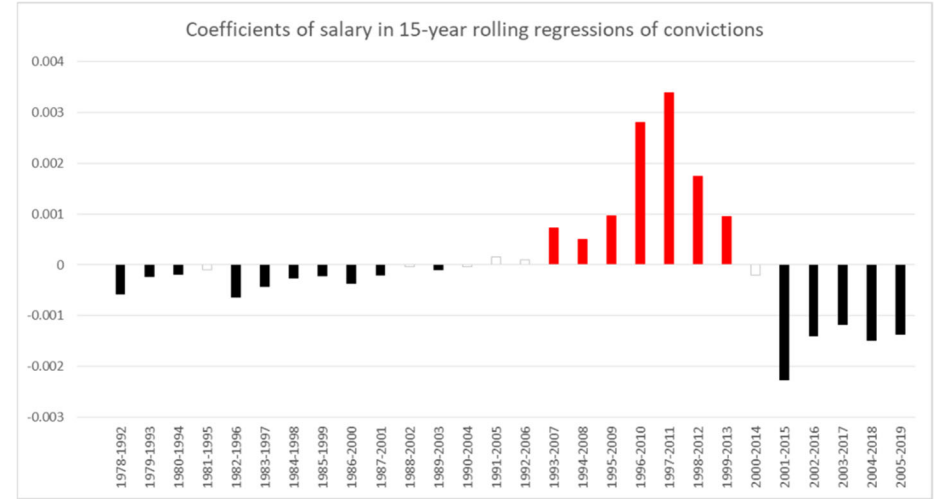
Figures 5-6 report the coefficients of the salary variable [Salary/Avg Salary All Depts]$_{t-3}$ in 15-year rolling co-integrating regressions of prosecutions and convictions respectively, in specifications similar to Table 10, column 1. Solid lines denote coefficients that are statistically significant at better than the 10% level.

Figure 7. Perceived anti-corruption effectiveness around 1997
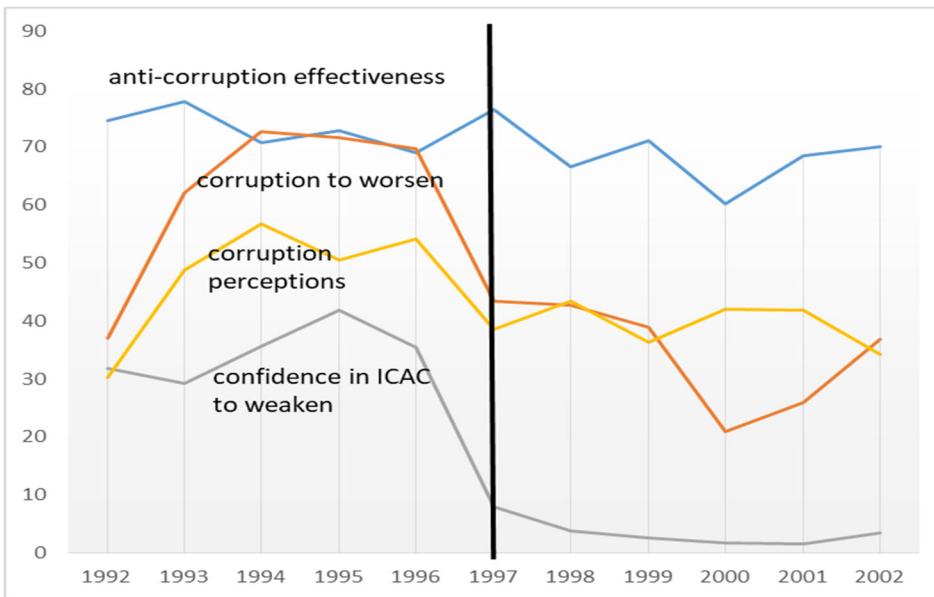
Figure 7 reports percentages (%) of respondents in the annual ICAC surveys who give the following answers to questions:

(1) ICAC's anti-corruption work is very effective/effective (anti-corruption effectiveness)

(2) Corruption will worsen after 1997 (post-1997: corruption will increase next year) (corruption to worsen)

(3) Percentage of respondents who consider corruption common/very common (corruption perceptions)

(4) 1997 regime change will weaken confidence in the ICAC's work (post-1997: confidence in the ICAC will decrease next year)

Source: ICAC Annual Surveys 1992-2002

Appendix A: Variable definitions and sources of data

Variable	Definition	Sources of data
Complaints	Number of corruption complaints (reports) received by the ICAC, annually by department. Also expressed as sum of past 3 years, in natural logarithms, in percentage 1st differences, and as a percentage of departmental *staffing* [When estimating natural logarithms, underlying observations with a value of 0 take the value of 0, underlying observations with the value of 1 take the value of ln(0.5+1), and the remaining observations take the value ln(value)]. The *Adjusted* series divides all observations by annual willingness to report corruption.	ICAC Annual Reports (1974-2019); ICAC Replies to Legislative Council Questions (1999-2021); Blair-Kerr (1973b)
Prosecutions	Number of persons prosecuted by the ICAC, annually by department. Also expressed as sum of past 3 years, in natural logarithms, in percentage 1st differences, and as a percentage of departmental *staffing* [When estimating natural logarithms, underlying observations with a value of 0 take the value of 0, underlying observations with the value of 1 take the value of ln(0.5+1), and the remaining observations take the value ln(value)]. The *Adjusted* series divides all observations by annual willingness to report corruption.	ICAC Annual Reports (1974-2019); ICAC Replies to Legislative Council Questions (1999-2021); Blair-Kerr (1973b)
Convictions	Number of persons convicted, following prosecution by the ICAC, annually by department. Also expressed as sum of past 3 years, in natural logarithms, in percentage 1st differences, and as a percentage of departmental *staffing* [When estimating natural logarithms, underlying observations with a value of 0 take the value of 0, underlying observations with the value of 1 take the value of ln(0.5+1), and the remaining observations take the value ln(value)]. The *Adjusted* series divides all observations by annual willingness to report corruption.	ICAC Annual Reports (1974-2019); ICAC Replies to Legislative Council Questions (1999-2021); Blair-Kerr (1973b)
$Bribes	By reading ICAC press releases about corruption cases we identify whether the receivers of bribes work for a government department and what amounts were paid as bribes. We also identify the exact year that the bribe was paid (not the date of the press release). Bribe amounts have been allocated to the exact year that they were paid. We include only bribes that were actually solicited or paid. We exclude bribes that were offered but were refused. We aggregate the dollar bribe amounts by department each year. Bribe amounts paid in foreign currencies have been converted to HK$ using quarterly exchange rates. All figures have been converted to constant 2020 HK$ using the implied GDP	ICAC press releases (1974-2017)

deflator. Expressed in natural logarithms, 1st differences, or scaled by departmental staffing and number of acceptors of bribes.

Salary	Average salary by department, calculated by dividing annual departmental expenses on personal emoluments (sum of salaries, allowances, and job related allowances) by the number of staff employed in the department (*Staffing*). All figures have been converted to constant 2020 HK$ using the implied GDP deflator. Expressed in natural logarithms, in percentage 1st differences, and as a percentage deviation from the average salary across all departments with data in a given year.	Hong Kong SAR Budget Estimates (Controlling Officer's Reports); Communications Authority, Companies Registry, ICAC, Hong Kong Monetary Authority, Hong Kong Post, Hospital Authority, Housing Authority, Kowlooon-Canton Railway Company, Land Registry, Legislative Council Commission, Office of The Ombudsman Annual Reports
Staffing	Number of staff employed in the department. It is based on the actual number of staff employed (*strength*). In cases where the actual strength is missing but the number of available positions in the department is available, whether they are filled or not (*establishment*), we estimate staffing by multiplying the establishment figure by the median of the nearest 5 years of available strength-to-establishment ratios for the department. Also expressed in natural logarithms.	Civil Service Bureau; Annual Digest of Statistics (Census and Statistics Bureau, 1967-2021); Hong Kong SAR Budget Estimates (Controlling Officer's Reports; 1967-2022); Communications Authority, Companies Registry, ICAC, Hong Kong Monetary Authority, Hong Kong Post, Hospital Authority, Housing Authority, Kowlooon-Canton Railway Company, Land Registry, Legislative Council Commission, Office of The Ombudsman Annual Reports
CPD Reports	Number of Assignment reports undertaken by ICAC's Corruption Prevention Department, annually by department (sum of past 5 years). Expressed in natural logarithms. [When estimating natural logarithms, underlying observations with a value of 0 take the value of 0, underlying observations with the value of 1 take the value of ln(0.5+1), and the remaining observations take the value ln(value)].	ICAC Annual Reports (1974-2019)
Hong Kong Criminality	Annual number of (non-corruption) criminal cases reported to or handled by the Hong Kong Police. Expressed in natural logarithms.	Annual Digest of Statistics (Census and Statistics Bureau, 1967-2021); Hong Kong SAR Budget Estimates (Controlling Officer's Report: Hong Kong Police Force, 1967-2022)
Post-Secondary Education	Percentage of population aged 15 and over with post-secondary degree.	Annual Digest of Statistics (Census and Statistics Bureau, 1967-2021)
GDP Growth Rate	Annual percentage growth rate of GDP in constant 2020 HK$.	Annual Digest of Statistics (Census and Statistics Bureau, 1967-2021)
Trade with Mainland	Proportion of total trade (exports plus imports) conducted with mainland China.	Annual Digest of Statistics (Census and Statistics Bureau, 1967-2021)

GDP per capita	GDP in constant 2020 HK$ divided by population. Expressed in natural logarithms.	Annual Digest of Statistics (Census and Statistics Bureau, 1967-2021)
Corruption Perceptions	Percentage of respondents who consider corruption "common" and "very common" or "quite common". In years with missing data we extrapolate the figure to the mid-point of the last available and next available figures. The ICAC conducted its 1st mass survey in 1977.	ICAC Mass Survey (1977-1990); ICAC Annual Survey (1992-2020)
Willingness to report corruption	Percentage of respondents who provide unequivocal answer that they would report corruption to the ICAC if it came to their attention. In years with missing data we extrapolate the figure to the mid-point of the last available and next available figures. The ICAC conducted its 1st mass survey in 1977.	ICAC Mass Survey (1977-1990); ICAC Annual Survey (1992-2020)
Anti-corruption investigative strength	The number of staff in the Operations Department of the ICAC, which is the department tasked with anti-corruption investigations. Expressed in natural logarithms.	ICAC Annual Reports (1974-2019)

Appendix B: Descriptive statistics about the sample

Department	Aggregate Corruption Activity (1974-2019)				Years with salary data available		Average annual salary per staff (1974-2019)	
	Complaints	Prosecutions	Convictions	CPD Assignments per year	From	To	Minimum	Maximum
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Hong Kong Police Force (formerly Royal Hong Kong Police Force)	24,143	1,094	416	2.96	1965	2019	114,474	588,796
Housing Authority	3,386	102	48	3.96	1974	2019	99,223	484,400
Correctional Services Department (formerly Prisons Department)	1,213	190	112	1.48	1974	2019	130,814	492,274
Immigration Department	1,076	52	21	2.43	1974	2019	128,579	491,291
Lands & Works Department (formerly Public Works Department)	1,001	97	38	5.64	1974	1984	116,661	215,009
Food & Environmental Hygiene Department	953	56	10	2.81	1999	2019	58,164	367,967
Buildings & Lands Department	772	18	12	2.07	1981	1995	83,497	321,147
Customs & Excise Department	731	69	25	2.53	1977	2019	106,809	488,681
Fire Services Department	704	53	27	0.98	1973	2019	112,037	493,363
Transport Department	618	20	12	2.00	1974	2019	98,489	612,765
Lands Department	501	19	11	1.67	1996	2019	332,271	529,378
Medical & Health Department	456	16	11	3.86	1974	1980	126,421	151,176
Home Affairs Department	450	18	8	1.41	1974	2019	134,020	531,814
New Territories Administration	414	6	1	3.00	1974	1980	112,596	194,446
Education Bureau	383	18	11	1.98	1973	2019	187,334	705,137
Post Office	367	56	30	0.78	1973	2019	108,310	446,656
Judiciary	350	20	3	0.65	1974	2019	166,383	739,839
Water Supplies Department	294	28	12	1.51	1981	2019	151,088	489,319
Leisure & Cultural Services Department	284	23	15	2.85	2000	2019	261,415	378,315
Social Welfare Department	254	10	9	1.13	1973	2019	129,222	551,504
Agriculture, Fisheries & Conservation Department	236	13	2	1.52	1974	2019	104,913	460,889
Electrical & Mechanical Services Department	216	12	2	1.63	1982	1995	28,480	146,702
Labour Department	208	4	4	1.02	1975	2019	124,126	599,428
Marine Department	204	40	17	1.04	1974	2019	96,393	508,624
Highways Department	197	25	10	0.65	1986	2019	200,960	655,284
Independent Commission Against Corruption (ICAC)	193	10	8	0.07	1974	2019	200,153	720,021
Buildings Department	191	5	2	1.71	1996	2019	489,439	706,514
Architectural Services Department	137	13	4	1.74	1986	2019	265,205	700,182
Government Secretariat	137	7	3	1.11	1974	2019	99,227	765,172
Inland Revenue Department	129	7	3	0.48	1974	2019	124,605	490,411
Legal Aid Department	104	2	1	0.50	1974	2019	160,965	572,613
Commerce & Industry Department	103	1	0	0.00	1974	1975	99,938	100,199
Hospital Authority	102	4	3	2.76	1999	2019	516,171	678,287

Department								
Office for Film, Newspaper & Article Administration	100	6	1	0.00	1980	2019	213,302	586,258
Department of Health	92	15	6	1.45	1989	2019	241,335	594,987
Trade & Industry Department	81	10	3	0.58	1982	2019	106,192	632,270
Radio Television Hong Kong	79	12	4	0.33	1974	2019	192,787	666,702
Civil Engineering & Development Department	74	3	2	1.74	1986	2019	259,729	731,644
Government Supplies Department	53	3	3	0.50	1974	2001	92,830	378,511
Department of Justice (formerly Legal Department)	46	3	1	0.20	1974	2019	237,917	782,488
Drainage Services Department	45	6	3	1.32	1989	2019	126,083	580,996
Registrar General's Department	45	0	0	1.67	1974	1982	124,291	171,901
Environmental Protection Department	44	4	2	1.51	1981	2019	239,152	687,173
Civil Aviation Department	43	2	2	0.41	1974	2019	210,206	851,711
Territory Development Department	37	3	2	0.24	1981	2001	238,886	709,389
Registration of Persons Office	33	0	0	1.00	1974	1974	90,778	90,778
Rating & Valuation Department	31	2	0	0.33	1974	2019	156,624	546,479
Treasury	24	0	0	0.17	1974	2019	142,297	516,283
Census & Statistics Department	21	2	2	0.13	1974	2019	113,608	489,166
Government Logistics Department	20	2	2	0.47	2003	2019	270,079	404,564
Kowloon-Canton Railway Corporation	20	1	1	0.85	1974	2007	91,122	470,025
Auxiliary Medical Service	18	2	2	0.15	1974	2019	101,572	402,628
Printing Department	15	3	3	0.21	1974	2001	90,448	310,577
Information Services Department	14	0	0	0.09	1974	2019	198,660	759,138
Official Receiver's Office	13	0	0	0.29	1992	2019	283,106	595,814
Civil Aid Service	12	0	0	0.04	1974	2019	111,489	448,993
Land Registry	10	1	0	0.24	2003	2019	454,023	570,579
Planning Department	10	0	0	0.37	1990	2019	350,547	716,446
Government Property Agency	9	2	2	0.43	1990	2019	314,481	721,188
Hong Kong Monetary Authority	8	1	0	0.50	2004	2019	986,213	1,465,561
Civil Service Training & Development Institute	5	1	0	0.00	1983	2001	291,548	570,277
Companies Registry	5	0	0	0.04	1994	2019	308,156	635,782
Hong Kong Observatory	5	1	0	0.04	1974	2019	186,308	685,139
Government Laboratory	3	0	0	0.17	1978	2019	212,949	730,857
Government Land Transport Agency	3	2	1	0.18	1980	2001	123,039	342,290
Invest Hong Kong	3	0	0	0.05	2000	2019	415,914	852,893
Office of the Communications Authority	3	0	0	0.77	1998	2019	677,910	870,146
Audit Department	2	0	0	0.00	1974	2019	203,505	865,804
Industry Department	2	0	0	0.17	1982	1999	194,003	553,428
Intellectual Property Department	2	0	0	0.20	1990	2019	261,375	813,369
Chief Executive's Office	1	1	0	0.00	1974	2019	159,218	702,892
Public Service Commission Secretariat	1	0	0	0.00	1974	2019	145,074	696,575
University Grants Committee	1	0	0	0.04	1974	2019	137,239	924,188
Royal Hong Kong Regiment (The Volunteers)	0	0	0	0.00	1974	1980	226,439	335,317
Government Flying Service	0	0	0	0.00	1974	2019	169,390	710,076
Independent Police Complaints Council	0	0	0	0.05	1985	2006	73,899	720,014
Information Technology Services Department	0	0	0	0.40	1998	2002	481,061	634,950

Joint Secr, Adv Bodies on Civil Service & Judicial Salaries & Cond of Service	0	0	0	0.00	1981	2019	283,632	1,058,876
Legislative Council Commission	0	0	0	0.05	1998	2019	605,862	904,549
London Office	0	0	0	0.00	1974	1980	263,094	476,148
Management Services Agency	0	0	0	0.00	1993	2000	314,534	719,782
Office of The Ombudsman	0	0	0	0.00	1978	2019	277,404	823,729
Office of Unofficial Members of Executive & Legislative Councils	0	0	0	0.00	1974	1978	190,989	321,969
Official Languages Agency	0	0	0	0.00	1996	2001	495,596	657,145
Registration & Electoral Office	0	0	0	0.00	1994	2019	126,674	737,122
Registry of Trade Unions	0	0	0	0.00	1974	1982	186,524	251,547
Secretariat, Commissioner on Interception of Comms & Surveillance	0	0	0	0.00	2006	2019	298,464	685,362
Standing Commission on Civil Service Salaries & Conditions of Service	0	0	0	0.00	1979	1999	218,072	846,470
Standing Commission on Disciplined Services Salaries & Cond of Service	0	0	0	0.00	1998	1999	565,963	568,833
Working Family & Student Financial Assistance Agency	0	0	0	0.17	1990	2019	207,377	478,032
Total	**41,540**	**2,196**	**933**					