# Corruption and the Cultural Evolution of Family Ties

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**Abstract**

We study the relation between conjugal family ties and corruption, as well as the important role of this relation for the cultural transmission of preferences regarding the strength of family ties. We show that the impact of family ties on the level of corruption, which can be either positive or negative, feeds back into the very process through which preferences for family ties are diffused from the older to the younger generations. As a result, the relation between family ties and corruption sets in motion mechanisms that govern the dynamics of cultural transmission. These dynamics determine long-term outcomes in terms of the population's cultural homogeneity or diversity with regard to their attitudes towards family ties.

*Keywords:* A13; D73; Z13

*JEL Classification:* Corruption; Cultural transmission; Family ties

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# 1 Introduction

The view that economic performance and the prevailing culture are inherently linked dates back to the 19th century and the ideas proposed by philosophers such as Max Weber and Karl Marx: The former argued that cultural change is a significant factor for economic outcomes, whereas the latter advocated the materialist view that cultural characteristics are mere by-products of the prevailing economic conditions. More recent years, however, have witnessed a rekindling of economists' interest on issues pertaining to the intersection between cultural change and economic performance, as this is evident from the number of theoretical and empirical studies that explore such themes (e.g., Bisin and Verdier 2000, 2001; Hauk and Sáez-Martí 2002; Manz *et al.* 2006; Doepke and Zilibotti 2008, 2017; Tabellini 2010; Michau 2013; Chakraborty *et al.* 2016; Varvarigos 2020).

A cultural aspect that has attracted increasing attention involves the strength of family ties. Taking account of the family's role as a primary unit of social organisation as well as a key medium of socialisation, instruction and indoctrination, it is not difficult to understand the appeal of family ties as a prominent cultural characteristic. Naturally, the sense of family values and the bonding among family members can be pertinent to several aspects of people's decision making – including decisions that have economic implications. Indeed, several studies have established a link between family ties – either *conjugal* (i.e., *nuclear*) or *extended* ones – and education (Duranton *et al.* 2009); economic development (Enke 2019); the labour market (Alesina *et al.* 2015); economic reform (Brumm and Brumm 2017); cooperative behaviour (Enke 2019); and political participation (Alesina and Giuliano 2011).

In this paper we focus on the relation between conjugal family ties and corruption, and study the implications of this relation for the intergenerational transmission process that determines the adoption of preferences regarding the strength of family ties. The motivation for our choice to investigate the dynamic implications of the family ties-corruption nexus is twofold: Firstly, corruption has several repercussions such as distorting the rule of law, discouraging private investment, inflating the cost of public investment, and shifting public infrastructure away from areas such as health and education – so much so that the World Bank classifies corruption "*among the greatest*

*obstacles to economic and social development*".[1] Secondly, the existing literature presents evidence on the relation between family ties and corruption, albeit ambiguous on its sign. Specifically, Marè *et al.* (2016) report that family ties increase corruption, whereas Ljunge (2015) and Litina and Varvarigos (2018) find that stronger family ties attenuate the level of corruption.

Our basis is the model of Litina and Varvarigos (2018) which, in turn, draws on the model of Alesina *et al.* (2015) – the aspects of locational preference, depending on the strength of conjugal family ties, and its implications for productivity – and enriches it with public employment, which is the source of corruption. In accordance with the existing evidence, the model shows that the effect of family ties on the level of corruption is ambiguous – it can be either positive or negative. In this study we enrich this model even further, by introducing dynamics through an explicit cultural transmission process whereby parents who have preferences for strong family ties try to inculcate their children with the same preferences. Furthermore, we incorporate an intragenerational learning externality which reduces the parents' cost of indoctrinating their children when preferences for strong family ties are more widespread among the population.

Most of the existing literature (e.g., Bisin and Verdier 2001, 2008) identifies the *oblique* transmission – the process whereby young agents adopt a cultural trait from socialisation *outside* the family (e.g., imitation of role models) – as the key factor behind the impact of the distribution of different cultural traits on the *vertical* transmission that occurs *inside* the family. Our model identifies another mechanism as well: A higher population share of preferences for strong family ties influences the level of corruption which, in turn, affects the provision of public goods. The latter outcome affects the marginal utility of leisure, thus inducing parents to also adjust the amount of time they devote for the cultural indoctrination of their children.

The aforementioned outcomes have significant implications for the dynamic process of cultural transmission. Initially, we present a baseline scenario where the intragenerational learning externality is strong enough to neutralise the impact of the oblique transmission. In this case, the relation between strong family ties and the level of

[1] https://www.worldbank.org/en/news/feature/2010/12/06/corruption-hunters-rally-for-action-against-fraud

corruption governs the dynamics of preferences in the sense that it determines if the population will be either culturally diverse, with regard to their preferences for weak or strong family ties, or culturally homogeneous due to the presence of path-dependence. Subsequently, we modify the model so that the intragenerational learning externality is not strong enough to offset the impact of the oblique transmission – a scenario where, in the absence of any relation between family ties and corruption, cultural indoctrination towards preferences for strong family ties would be decreasing in the share of the population who carry the same preferences. The main point of the influential work by Bisin and Verdier (2001) is that this type of *cultural substitution* rules out path-dependence in the process of cultural transmission, thus ensuring a diverse long-run distribution of preferences among the population, in contrast to evolutionary selection mechanisms which are conducive to path-dependence and to some traits becoming dominant. In our model, however, when the strength of family ties is favourable to a higher level of corruption, the process of intergenerational cultural transmission may still generate path-dependent outcomes, even though the oblique transmission incites cultural substitution. This is simply due to the fact that the positive effect of family ties on the incidence of corruption sets in motion mechanisms that counteract, hence they enrich, the ones that are associated with cultural substitution.

All in all, our study makes two contributions to the existing literature. Firstly, it presents a systematic study of how the relation between conjugal family ties and the incidence of corruption governs the intergenerational transmission of distinct cultural traits regarding family values. Secondly, it utilises the family ties-corruption nexus to make a more general point about the dynamics of cultural transmission: In the presence of additional channels through which the distribution of preferences among the population determines how intensely parents socialise and indoctrinate their children, the process of cultural transmission can lead to path-dependent outcomes, even though the oblique transmission is a source of cultural substitution.

Since corruption is an important element of our theory, there is a point of comparison with the model of intergenerational transmission of attitudes on corruption by Hauk and Sáez-Martí (2002). In their framework, multiple equilibria may emerge even under cultural substitution, because of the strategic considerations that emanate

from the joint determination of the payoffs from corrupt behaviour and of the values that promote such behaviour. In our framework, the cultural transmission process involves the desired strength of family ties rather than attitudes to corruption. Furthermore, the source of path-dependence is also different: It is not related to aspects of coordination and expectations, but to the additional mechanisms that the family ties-corruption nexus instigates during the process of cultural transmission.

The remainder of our study is structured as follows: In Section 2 we present empirical correlations that are consistent with the model's main outcomes. Section 3 presents a theoretical model of family ties and corruption, while Section 4 introduces and analyses the dynamics of cultural transmission, thus deriving the main implications regarding the adoption of preferences for strong family ties among the population. In Section 5 we conclude.

# 2 Empirical Motivation

Our theoretical model suggests that the relation between family ties and corruption is key in determining whether the dynamics of preferences for family ties will converge to a unique equilibrium, in terms of the distribution of such preferences among the population, or they will be path-dependent, meaning that the pre-existing distribution of preferences will determine the long-run equilibrium. In other words, the family ties-corruption nexus has implications for either the convergence or the divergence with regard to the population distribution of family ties among different countries.

To examine this implication empirically, we motivate our paper with evidence from the European Values Study (EVS) – a large-scale cross-national survey with four waves covering the 1981-2008 period. The use of the EVS is ideal for the purpose of our analysis for several reasons. First, it provides measures of family ties and of corruption that have been traditionally used in the literature. Second, given that our sample contains primarily European countries, the notion of family ties is rather comparable,

meaning that while there is variation in the strength of family ties across countries and over time, yet the concept of family ties is similar in the vast majority of these countries.[2]

Our approach in examining empirically the implications of the theoretical framework is simple and intuitive. Using the aforementioned sample, we correlate graphically the initial value of the family ties variable with the growth rate of the same variable. As initial value we define the value of family ties in the first year of our sample, i.e., the mean value for each country during first available wave of the EVS (i.e., 1990-1993 for our measure of family ties – see below). As the final value, we use the value derived from the fourth wave of the EVS. We illustrate this correlation for two groups of countries. The first group is a set of countries for which corruption and family ties correlate positively (Group A) while the second is a group of countries for which corruption and family ties correlate negatively (Group B). It should be noted that our motivating evidence does not aspire to be a fully-fledged empirical analysis; hence, the correlations we illustrate are unconditional correlations.

We follow some benchmark studies (e.g., Alesina and Giuliano 2011; Alesina *et al*. 2015) that use measures of family ties from the EVS. Our measure is derived from the question about how important is family for the respondent's life. Answers vary from 1 to 4 with '1' indicating that family is not important at all and '4' indicating that it is very important.[3] With regard to the measure of corruption, we use two alternative proxies. The first proxy entails the response to the following question from the EVS: "*How justifiable do you find it to accept a bribe*?" The variable takes values from 1 to 10 with '1' corresponding to "never" and '10' corresponding to "always". Thus a higher value of this variable is associated with more favourable views – and, therefore, a greater inclination – towards corruption. The second proxy is the standard Corruption Perception Index (CPI) which takes values from 0 to 10, with higher values being indicative of higher levels of corruption.[4]

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[2] Our sample contains 24 countries. These are Austria, Belgium, Bulgaria, Czech Republic, Germany, Denmark, Spain, Estonia, Finland, France, Great Britain, Hungary, Ireland, Italy, Lithuania, Latvia, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia and Sweden.

[3] Note that in the original questionnaire, the family ties variable is measured in reverse order – high scores indicate reduced strength of family ties. To facilitate the analysis' interpretation and to avoid confusion, we have reversed the original variable by using the transformations $5-\chi$, where $\chi$ is the original score from the EVS.

[4] The CPI is available online at:

Figures 1.A and 1.B illustrate the correlation between the initial value and the growth rate of the family ties variable. What emerges is a positive (negative) correlation when we use data from countries in which the measures of family ties and corruption – in this case, the responses on the justifiability of bribery – correlate positively (negatively). The same implications are drawn from Figures 2.A and 2.B where we use the second proxy for corruption, i.e., the CPI. Naturally, the countries within Groups A and B differ between the two proxies of corruption – given that different measures encompass different aspects of corrupt behaviour and activities – however they overlap to a large extend. More importantly, both cases indicate the possible presence of forces that generate divergence (convergence) in the relative strength of family ties in countries where there is a positive (negative) relation between family ties and corruption. Our theoretical framework will present mechanisms that offer credence to this possibility.

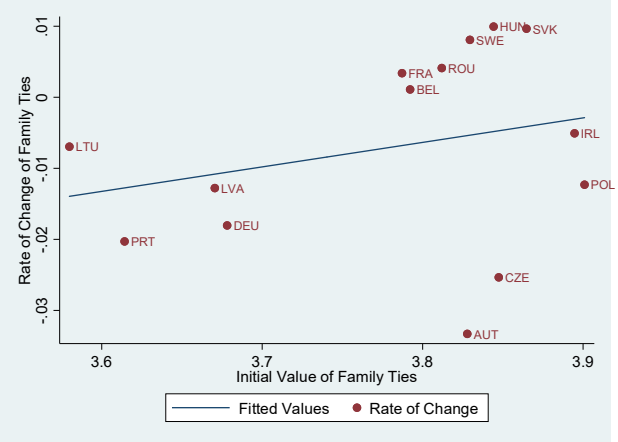


**Figure 1.A** *Group A of countries*

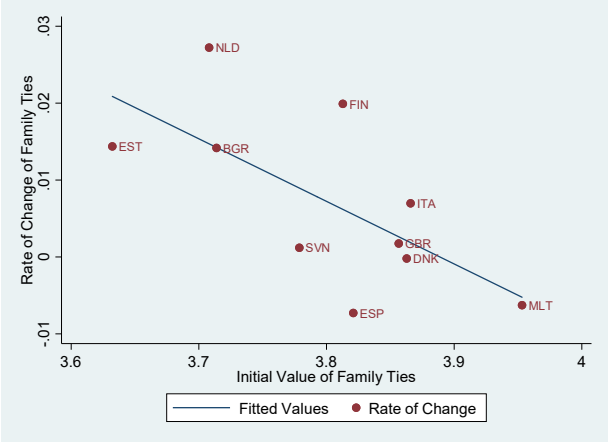


**Figure 1.B** *Group B of countries*

https://www.transparency.org/news/feature/corruption_perceptions_index_2017?gclid=Cj0KCQiA-4nuBRCnARIsAHwyuPpKlAiTreSsZnLuRHPDKBGhjXoR4KrQu3gpbPyl6X9Z5Qx-tfcysngaAjRdEALw_wcB

Similarly to our family ties variable, the original ranking is a reverse one. For this reason, our analysis reverses the measure using the transformation $10-\chi$, where $\chi$ is the original score of the CPI.

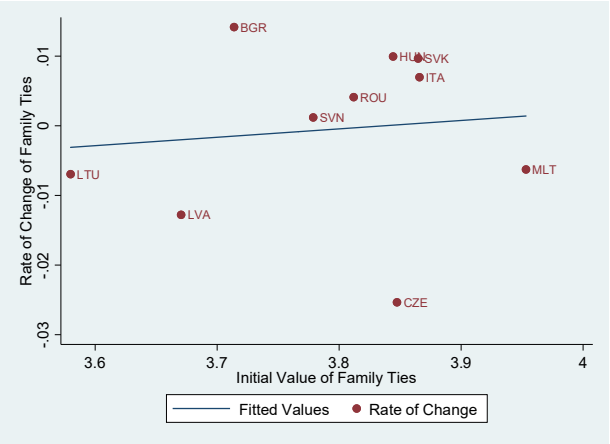


**Figure 2.A** *Group A of countries*

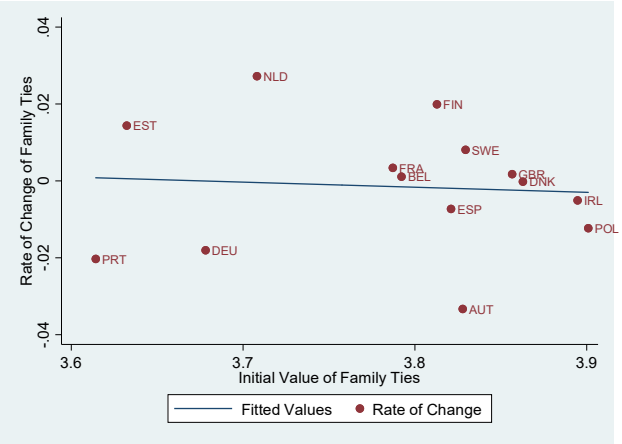


**Figure 2.B** *Group B of countries*

# 3 A Simple Model of Family Ties and Corruption

The model in this section is based on Litina and Varvarigos (2018) who, in turn, draw on Alesina *et al.* (2015). Similar to these studies, the focus is on conjugal family ties that are mainly manifested through the locational preference of people who possess a desire to retain a strong bonding with their parents and their children.[5]

Time is discrete and indexed by $t = 0,1,2,\ldots$. Consider an infinite horizon economy populated by a sequence of overlapping generations of couples who have a lifespan of three periods. Henceforth, the three periods of a couple's lifetime will be referred to as childhood, youth and old-age – the latter two being the periods of adulthood. The individuals who form a couple share the same preferences and make all their decisions jointly. There is no population growth since each couple gives birth to a couple, and so on. To save on notation, the population mass of couples is normalised to 1. We shall be referring to couples as 'agents' hereafter.

During childhood, agents adopt a cultural trait that will ultimately determine their desire to retain strong ties with their immediate family, i.e., with their parents and

[5] Another implication of our attention to conjugal family ties is that we keep a tight focus on the closeness between family members when measuring the utility of those who have been inculcated with strong family ties. In other words, we do not consider other issues pertaining to extended family ties, which would entail additional considerations with regard to corruption (e.g., nepotism).

with their children, in adulthood. There are two such traits, indexed by $j=\{s,w\}$. Type-$s$ agents are those who have been inculcated with a preference for strong family ties; Type-$w$ agents are those who did not adopt such preferences. Let $f_t \in [0,1]$ be the population share of young agents in time $t$ who have adopted preferences for maintaining close ties with their families. For the moment, $f_t$ is taken as given. Later on, however, it will be treated as endogenous, since the distribution of cultural traits among the population will be determined through an explicit process of intergenerational transmission of preferences.

Young agents earn income, enjoy the consumption of (private and public) goods, and rear their children. Nature distinguishes the individuals who form a couple according to their occupational characteristics. One of them is a producer of a private good. Appealing to the idea that there is a greater set of productive opportunities and a better skills matching for people who do not restrict their choices in terms of location, it is assumed that the private producer's productivity is a function of the location in which agents decides to reside (e.g., Alesina *et al.* 2015). If agents are willing to move to any location away from their parents' place of residence, private production will result in $(1+\omega)y$ units of output with certainty, where $\omega, y>0$. If, however, agents restrict themselves in residing to the location of their parents, private production will result in the same amount of output, i.e., $(1+\omega)y$, only with probability $\pi \in (0,1)$, whereas with probability $1-\pi$ private production will generate only $y$ units of output.

The other individual is employed as a civil servant in the public sector. In exchange for a salary $B>0$, his role is to operate a project that transforms units of public funds into units of utility-enhancing public goods on a one-to-one basis. Nevertheless, the civil servant is corruptible in the sense that he may abuse his position and invest only a fraction $z \in (0,1)$ of the funds that the government allocates to him for the operation of the project, thus expropriating the remaining amount for his own benefit.[6] In the event that his wrongdoing is revealed, something that happens with probability $\mathrm{M}_{j,t} \in [0,1]$, he faces financial penalties – i.e., the loss of his salary and of his ill-gotten gains – whereas he and his partner will also face a proportional loss of their utility when

[6] Litina and Varvarigos (2018) delve deeper into the microfoundations of the civil servant's misconduct.

young, as a result of the distress, stigma and shame that emanate from the revelation of his misconduct as well as from the punishment for it (e.g., dismissal from employment; imprisonment etc.). It is assumed that $\mathrm{M}_{j,t}$ is uniformly distributed across all civil servants of the same type (i.e., $j=\{s,w\}$). Specifically,[7]

$$\mathrm{M}_{j,t}=\frac{\mu_{j,t}}{F_{j,t}}, \tag{1}$$

where

$$\mu_{j,t}\in\begin{cases}[0,f_t] & \text{if} \quad j=s\\ [0,1-f_t] & \text{if} \quad j=w\end{cases}, \quad F_{j,t}=\begin{cases}f_t & \text{if} \quad j=s\\ 1-f_t & \text{if} \quad j=w\end{cases}. \tag{2}$$

As long as they have been inculcated with preferences for strong family ties, young agents will enjoy a utility gain from the decision to reside in the close vicinity of their parents. On the contrary, the decision to move away from their parents will result in a loss of utility. For agents who have not been inculcated with preferences for strong family ties, their choice of location will not generate any utility gain or loss *per se*.

Given the characteristics of the model, the utility of young Type-$j$ agents can be expressed as

$$U_{j,t}=(c_{j,t}+\Phi_j)(1-S)+a_t, \tag{3}$$

where $a_t$ is the amount of utility-enhancing public goods, $c_{j,t}$ denotes consumption of private goods, and

$$\Phi_j=\begin{cases}\varphi & \text{if } j=s \text{ and agents reside in their parents' location}\\ -\varphi & \text{if } j=s \text{ and agents reside away from their parents' location}\\ 0 & \text{if } j=w, \text{ irrespective of the agents' location}\end{cases} \tag{4}$$

such that $\varphi>0$. The term $S$ quantifies the proportional loss in utility, due to the stigma, shame and punishment from the revelation of a corrupt civil servant's misconduct.[8] It is assumed that

[7] This assumption follows Varvarigos (2017). It is meant to capture agents' varying abilities in avoiding detection, either through their networking with people who can assist them towards this purpose, or by being vigilant and avoiding patterns of behaviour that would expose their excessive wealth.

[8] These deleterious effects do not impinge on the utility that emanates from the provision of public goods. This is a simple technical device to rule out strategic elements and issues of coordination from a civil servant's decision to be either corrupt or remain honest. These would have complicated the analysis considerably, without adding anything of significance to our results.

$$S=\begin{cases}\sigma\in(0,1) & \text{if the civil servant is corrupt, and is eventually revealed as such}\\ 0 & \text{if the civil servant is corrupt, but avoids detection}\\ 0 & \text{if the civil servant is honest}\end{cases} \tag{5}$$

All young agents pay a lump-sum tax $T>0$. The government uses the revenues from taxation to finance the operation of the public sector – the civil servants' salaries and the funds allocated to them, denoted $G$, for the delivery of public goods. To simplify the analysis, all items in the public budget are tied to the economy's output, according to $B=by$, $G=gy$ and $T=\tau y$, where $b,g,\tau\in(0,1)$. It follows that the balanced-budget constraint can be expressed as

$$\tau=g+b. \tag{6}$$

Taking account of the above, the quantity of public goods is given by

$$a_t=gy[1-\Theta_t(1-z)], \tag{7}$$

where $\Theta_t\in(0,1)$ is the number of civil servants (both Type-$s$ and Type-$w$ ones) who are corrupt.

By virtue of (4) and the characteristics of private production, young agents who have not been inculcated with a desire to retain strong family ties (i.e., $j=w$), will optimally choose to move away from their parents' location. Given this, let us combine (1)-(6) and consider a Type-$w$ civil servant. He will be corrupt as long as the agents' expected utility from doing so, i.e.,

$$U_{w,t}^{corrupt}=\left(1-\frac{\mu_{w,t}}{1-f_t}\right)(1+\omega-gz)y+\frac{\mu_{w,t}}{1-f_t}(1+\omega-g-b)y(1-\sigma)+a_t, \tag{8}$$

exceeds the agents' utility in the scenario where he is honest, i.e.,

$$U_{w,t}^{honest}=(1+\omega-g)y+a_t. \tag{9}$$

Equating the utility functions in (8) and (9) yields the equilibrium number of corrupt Type-$w$ civil servants as

$$\widehat{\mu_{w,t}}=\theta_w(1-f_t), \tag{10}$$

where

$$\theta_w\equiv\frac{g(1-z)}{g(1-z)+\sigma(1+\omega-g-b)+b}. \tag{11}$$

Now, consider agents who have been inculcated with a preference for retaining strong ties with their families (i.e., $j = s$). Given (4) and the characteristics of private production, these agents may be willing to accept a loss of potential income, as long they can remain close to their parents. In this case, we can combine (1)-(6) to write Type-$s$ agents' utility – depending on whether the civil servant is honest or corrupt – as follows:

$$U_{s,t}^{honest} = (1 + \pi\omega - g)y + \varphi + a_t, \tag{12}$$

$$U_{s,t}^{corrupt} = \left(1 - \frac{\mu_{s,t}}{f_t}\right)[(1 + \pi\omega - gz)y + \varphi] + \frac{\mu_{s,t}}{f_t}[(1 + \pi\omega - g - b)y + \varphi](1 - \sigma) + a_t. \tag{13}$$

Combining (1)-(6) once more, the corresponding expressions for the utility of Type-$s$ agents who move away from their parents' location are

$$U_{s,t}^{honest} = (1 + \omega - g)y - \varphi + a_t, \tag{14}$$

$$U_{s,t}^{corrupt} = \left(1 - \frac{\mu_{s,t}}{f_t}\right)[(1 + \omega - gz)y - \varphi] + \frac{\mu_{s,t}}{f_t}[(1 + \omega - g - b)y - \varphi](1 - \sigma) + a_t. \tag{15}$$

Similarly to Alesina *et al.* (2015), we adopt the following condition which ensures that Type-$s$ agents will always find optimal to reside close to their parents when they become adults:[9]

$$\varphi > \frac{[g(1 - z) + (1 - \pi)\omega + \sigma(1 + \pi\omega - g - b) + b]y}{2 - \sigma} \equiv \hat{\varphi} \tag{16}$$

The condition in (16) implies that the highest possible utility attained when moving to a different location (i.e., Eq. 15 for $\mu_{s,t} = 0$) falls short of the lowest possible utility attained when staying to the parent's location (i.e., Eq. 13 for $\mu_{s,t} = 1$). Consequently, the equilibrium number of corrupt Type-$s$ civil servants can be derived after equating (12) and (13). It follows that

$$\widehat{\mu_{s,t}} = \theta_s f_t, \tag{17}$$

where

$$\theta_s \equiv \frac{g(1 - z)}{g(1 - z) + \sigma(1 + \pi\omega - g - b) + b + \dfrac{\sigma\varphi}{y}}. \tag{18}$$

Combining the results in (10) and (17), we can determine the total number of corrupt civil servants

[9] Evidence by Giuliano (2007) and Alesina and Giuliano (2010) supports this assumption.

$$\Theta_t = \theta_w(1-f_t) + \theta_s f_t = \Theta(f_t)\,, \tag{19}$$

which can be substituted in (7) to derive

$$a_t = gy\{1-[\theta_w(1-f_t) + \theta_s f_t](1-z)\} = a(f_t)\,. \tag{20}$$

Defining the composite term

$$\tilde{\varphi} \equiv (1-\pi)\omega y\,, \tag{21}$$

it is straightforward to combine (11) and (18)-(21) and establish that

$$\Theta'(f_t)\begin{cases} >0 & \text{if} \quad \varphi < \tilde{\varphi} \\ <0 & \text{if} \quad \varphi > \tilde{\varphi} \end{cases},\ a'(f_t)\begin{cases} <0 & \text{if} \quad \varphi < \tilde{\varphi} \\ >0 & \text{if} \quad \varphi > \tilde{\varphi} \end{cases}. \tag{22}$$

Given the above, the impact of a shift in the distribution of different family values – favouring strong family ties – on corruption is summarised in

**Proposition 1.** *Assuming that* $\tilde{\varphi} > \hat{\varphi}$ *holds, an increase in the population share of people with a desire for strong family ties has an ambiguous (i.e., either positive or negative) effect on the incidence of corruption and, therefore, on the provision of public goods.*

*Proof.* It follows from the results in (22). ■

There are two conflicting mechanisms that permeate the effect of family ties on the incidence of corruption. On the one hand, the ill-gotten gains of a civil servant's misconduct are the means through which agents with preferences for strong family ties can counteract the possible income loss, incurred as a result of their desire to reside close to their parents, while relinquishing more productive opportunities elsewhere. On the other hand, these agents will face more detrimental consequences from the possible revelation and punishment of such misconduct, as the stigma, shame and anguish will also impinge on the enjoyment of being close to their parents. Obviously, a similar ambiguity applies to the effect of family ties on the delivery of public goods – corruption is, after all, a process whereby people who are involved with the public sector extract private rents at the expense of public goods' provision.

# 4 The Evolution of Family Values

So far, we have treated the distribution of preferences for either strong or weak family ties across the population as given. Hereafter, we relax this assumption. Instead, this distribution will become endogenous, as a result of a dynamic process of cultural transmission *à la* Bisin and Verdier (2001).

Let us consider a scenario where agents have $N$ units of available leisure time at the beginning of their adulthood. The private good producer devotes (inelastically) 1 unit of time to the production of goods. Similarly, the civil servant devotes (again, inelastically) 1 unit of time as a public sector employee. Therefore, agents are left with $N-2$ units of available time, to be used for leisure activities, denoted $n_{j,t}$, and to undertake the cultural indoctrination of their children – if they have an incentive to do so.

We shall assume that, in addition to their direct effect on utility, public goods increase the marginal utility of leisure as well. Indeed, publicly-funded amenities (e.g., parks, roads, beaches, libraries, museums etc.) can enhance the enjoyment of various leisure activities. To minimise the technical complexity of the model, however, we also assume that leisure activities, and the utility accruing from them, are not subject to the deleterious effects of stigma and anguish, in the event that the civil servant's malversation is revealed. We justify this assumption by appealing to the idea that leisure time offers to agents the opportunity to avoid the intrusion and condemnation from other people who are aware of the civil servant's wrongdoing.

Young agents who wish to instil a preference for strong family ties in their children, can do so by means of a process of cultural indoctrination. Specifically, they need to devote $k(e_{j,t}, f_t) \geq 0$ units of time – where $k(0, f_t) = 0$, $k_{e_{j,t}}, k_{e_{j,t}e_{j,t}} > 0$ and $k_{e_{j,t}f_t} < 0$ – to achieve a probability $e_{j,t} \in [0,1]$ of successfully inculcating their children with a desire to retain strong family ties. It follows that leisure time is given by

$$n_{j,t} = N - 2 - k(e_{j,t}, f_t). \tag{23}$$

Note that the effect of $f_t$ on $k(\cdot)$ captures the scenario whereby an increased number of people who have preferences for strong family ties, expands the set of experiences with regard to the process that induced them to adopt this cultural trait

when they, themselves, were in childhood. These experiences generate a positive learning externality, as the process of social interactions allows parents to share such experiences, thus facilitating them in their efforts to instil similar cultural traits in their own children. Evidence on the positive learning externalities that emanate from social interactions is provided by Goolsbee and Klenow (2002), whereas other studies (e.g., Riley 1990; Cochran and Niego 2002) argue that social networks enable parents to adopt and improve their parenting practices through information sharing or through advice and discussions on childrearing.

In the event that the parents' efforts are not successful, i.e., with probability $1-e_{j,t}$, their children may still assume a desire for strong family ties through the oblique transmission, i.e., with probability $m_j(f_t)\in[0,1]$ $(m'>0)$. This is meant to capture the idea that children in time $t$ will adopt the cultural values and norms of role models whom they pick out of their interactions with the existing population of adults. Following Bisin and Verdier (2001), we assume that for agents who grow up with Type-$s$ parents – i.e., parents who adopted a preference for strong family ties when they, themselves, were in their childhood – the oblique transmission is characterised by

$$m_s(f_t)=f_t\,. \tag{24}$$

Nevertheless, we also follow Sáez-Martí and Sjögren (2008) in assuming that for agents who grow up with Type-$w$ parents – i.e., parents who did not adopt a preference for strong family ties when they, themselves, were in childhood – this probability falls short of the population share of young agents who possess the Type-$s$ trait. Formally, we consider a parameter $\bar{m}\in(0,1)$ such that

$$m_w(f_t)=\bar{m}f_t\le f_t\,, \tag{25}$$

In general, this idea derives from what Sáez-Martí and Sjögren (2008) term as 'negative bias' towards a cultural trait. In the context of our model, this may indicate that, on the outset, those who grow up in a Type-$w$ household have a negative predisposition against cultural values and norms with which they are not directly familiar through their immediate family.[10]

[10] Sáez-Martí and Sjögren (2008) provide explicit microfoundations behind the positive or negative bias towards cultural traits.

Earlier, the expression in (4) described how different types of family values affect the utility of young agents, with regard to their choice of staying close to their parents, or moving away from them. Here, this expression also underlies the reason why agents may wish to devote the effort to induce their offspring into the adoption of strong family ties. As long as they are of Type-$s$, thus abiding by similar family values, they will enjoy a utility gain $\varphi > 0$ when old, if their (adult) children decide to stay in their vicinity, whereas a utility loss of $-\varphi$ will apply if their children move away when they reach adulthood. Type-$w$ agents, who do not have a desire for strong family ties, experience neither a utility gain nor a utility loss when old, as a result of their children's choice of location. Immediately, this reveals that, by virtue of $k_{e_{w,t}} > 0$, Type-$w$ agents will not devote any effort in instilling a preference for strong family ties in their offspring, i.e., $e_{w,t} = 0$, simply because they will not get any utility benefit from doing so. Recall that the motivation behind the parents' desire to instil their own family values in their children, is the utility that parents, themselves, may enjoy in the event that their children reside close to them when they reach adulthood. It is for this reason that Type-$w$ agents do not try to transmit their own values in their children; they simply have no incentive to do so.[11] It follows that $n_{w,t} = N - 2$ and, therefore, their utility will be either

$$V_{w,t}^{corrupt} = U_{w,t}^{corrupt} + X(a_t)n_{w,t}, \tag{26}$$

or

$$V_{w,t}^{honest} = U_{w,t}^{honest} + X(a_t)n_{w,t}. \tag{27}$$

The term $X(a_t)$ is an increasing function, which captures the positive effect of public goods on the marginal utility of leisure, and for which we specify

$$X(a_t) = x + a_t, \quad x > 0. \tag{28}$$

[11] This may appear different from other research work on cultural transmission where parents obey to some sort of *paternalistic* altruism, in the sense that they have the subjective belief that their children will be better-off if they adopt their own cultural characteristics. Here, conjugal family ties are associated with a more selfish motive – parents with a preference for strong family ties want their children to be close to them, whereas parents with no such preferences are simply indifferent, as their locational proximity to (or remoteness from) their children bears no impact on their utility. It should be noted that, depending on the preference trait under investigation, existing studies on cultural transmission have also deviated from the idea of paternalistic altruism. For example, Sáez-Martí and Sjögren (2008) consider a scenario where the vertical transmission is attributed to parents' *pure* altruism towards their children, after they outline a host of examples where this may apply (e.g., attitudes to education; eating habits etc.).

Note that the actual expressions for $U_{w,t}^{corrupt}$ and $U_{w,t}^{honest}$ are given in (8) and (9) respectively, depending on the conduct of civil servants. Together with (26) and (27), they reveal that the decisions by Type-$w$ agents will be the same as in Section 2, meaning that the results in Eq. (10)-(11) still hold.

Before we proceed, it should be noted that the lack of consumption expenditures in old age is adopted for mathematical convenience and for avoiding the use of excessive notation. It does not necessarily affect our main results and implications. For example, consider a case where the utility function's consumption component is $c_{j,t}^{1-\rho}c_{j,t+1}^{\rho}$ where $c_{j,t+1}$ is consumption in old age. Furthermore, consider the presence of a technology that allows the storage of goods on a one-to-one basis. In this case, agents would choose to consume a fixed fraction $1-\rho$ of their total income when young, while storing the remaining fraction $\rho$ for consumption when old. What is important is that, in equilibrium, the term $c_{j,t}^{1-\rho}c_{j,t+1}^{\rho}$ would be linear in young agents' income, thus leaving subsequent calculations and results mostly unaffected in comparison to what we present in this study. A similar argument applies to the impact of public goods on old agents' utility: We could have added a utility term $\nu(a_{t+1})$ $(\nu'>0)$ to capture this impact. As long as agents take the quantity of public goods as given, something that is indeed true in our model, this added term would have no bearing on our existing results

Now, we shall turn our attention to Type-$s$ agents and define $Q_{s,t+1}$ as the probability that their children will reside close to them when they reach adulthood. Therefore, given a discount factor $\rho\in(0,1)$, the agents' utility – depending on their own location and on whether the civil servant decides to either behave honestly or to seek private rents through corruption – will be either[12]

$$V_{s,t}^{honest}=U_{s,t}^{honest}+X(a_t)n_{s,t}+\rho[Q_{s,t+1}\varphi+(1-Q_{s,t+1})(-\varphi)], \tag{29}$$

or

$$V_{s,t}^{corrupt}=U_{s,t}^{corrupt}+X(a_t)n_{s,t}+\rho[Q_{s,t+1}\varphi+(1-Q_{s,t+1})(-\varphi)], \tag{30}$$

[12] The utility component regarding family values, during the Type-$s$ agents' old age, is not affected by the stigma and anguish that stem from the revelation of a civil servant's misconduct. Therefore, there is an implicit assumption that the utility cost of being revealed as a fraudster dissipates over time – it applies only to the period where the misconduct was actually revealed, i.e., during the agents' youth. Furthermore, note that, similar to Type-$w$ agents, they also enjoy utility from public goods when old.

The expressions in (29)-(30) reveal that the agents' choice regarding leisure, as well as their probability that their adult children will stay close to them, are not affected by their own location. Consequently, the condition in (16) is still sufficient to ensure that all agents who have a desire to retain strong family ties will reside in their parents' location once they reach adulthood. In other words, $U_{s,t}^{honest}$ and $U_{s,t}^{corrupt}$ are given in (12) and (13) respectively. Another implication of the condition in (6) is that $Q_{s,t+1}$ is also the probability that Type-$s$ agents' children will adopt a preference for strong family ties. That is,

$$Q_{s,t+1} = e_{s,t} + (1 - e_{s,t}) m_s(f_t). \tag{31}$$

In order to derive analytical results, we need a specific functional form for the parental effort component $k(e_{s,t}, f_t)$. With the purpose of clarifying the mechanisms that permeate the dynamics of cultural transmission, we shall consider two different specifications regarding this effort component. The first one will act as a baseline scenario that, in the absence of corruption, strips away any *direct* cultural substitution – i.e., circumstances where the optimal choice for $e_{s,t}$ is decreasing in $f_t$. The second one will bring our framework closer to the convention of the existing literature, as the presence of cultural substitution will, in the absence of corruption, make the optimal choice for $e_{s,t}$ decreasing in $f_t$. As we shall see, however, the *indirect* effects that emanate from the impact of family ties on corruption – effects that are summarised in Proposition 1 – will enrich the outcomes and implications in both these cases.

### 4.1 A Baseline Scenario

Consider the following specification:

$$k(e_{s,t}, f_t) = \kappa(1 - f_t) e_{s,t}^2, \tag{32}$$

where $\kappa > 1$. To guarantee that leisure time is non-negative, we also assume that $N > 2 + \kappa$. Using either (29) or (30), we can substitute (23), (24), (28), (31) and (32) to derive $\frac{\partial V_{s,t}}{\partial e_{s,t}} = 0$ and, therefore, obtain the optimal choice for $e_{s,t}$ as

$$\widehat{e_{s,t}} = \frac{\rho\varphi}{\kappa(x + a_t)}, \tag{33}$$

where, given (7), it is assumed that $\rho < \kappa(x + gyz)/\varphi$ in order to ensure that $\widehat{e_{s,t}} < 1$. As we can see, the choice in (33) is independent of the possibility that the agents' resources may be augmented by the civil servants' ill-gotten gains. Therefore, equating the utility functions in (29) and (30) will yield the same result with regard to the number of corrupt Type-$s$ civil servants, as in Eq. (17)-(18).

As a means of understanding the impact of corruption on the process of cultural transmission, let us disregard the result of Proposition 1 for a moment and, instead, consider a case where the distribution of different preferences for family ties among the population does not affect corruption at all. Formally, this is a case where $\Theta(f_t) = \Theta \ \forall f_t$ and, therefore, $a(f_t) = a \ \forall f_t$. In these circumstances, the extent to which the population endorses values and norms that are conducive to strong family ties does not have a *direct* effect on the parents' efforts to instil similar values and norms in their children, i.e., $\partial\widehat{e_{s,t}}/\partial f_t = 0$. The reason is that $f_t$ has two conflicting effects on the optimal effort towards cultural indoctrination. On the one hand, a higher $f_t$ increases the likelihood that agents will adopt a preference for strong family ties through the oblique transmission, thus reducing the parents' incentives to incur the reduction in leisure necessary to achieve the same outcome. On the other hand, a higher $f_t$ reduces the marginal effort cost of inculcating children with a desire to maintain strong family ties, due to the positive learning spillovers to which we alluded earlier. Under the specification in Eq. (32), these two effects cancel each other out.

Nonetheless, the distribution of preferences for family ties does have an effect on corruption as we know from Proposition 1. Given this, any change in the distribution of cultural traits among the population will have an *indirect* effect on cultural indoctrination. To see this, use (20) to rewrite (33) as

$$\widehat{e_{s,t}} = \frac{\rho\varphi}{\kappa[x + a(f_t)]} = e_s(f_t), \tag{34}$$

an expression that allows us to infer the result in[13]

**Proposition 2.** *When preferences for strong family ties become more widespread among the population, parents will intensify their efforts to inculcate their children with a desire to retain strong family ties, as long as the prevalence of this cultural trait increases the incidence of corruption. Otherwise, parents will moderate their efforts to instil a desire for strong family ties in their children.*

*Proof.* Combining (22) and (34), we can establish that

$$e_s'(f_t)=\frac{-\rho\varphi a'(f_t)}{\kappa[x+a(f_t)]^2}\begin{cases}>0 & \text{if} \quad \varphi<\tilde{\varphi}\Leftrightarrow\Theta'(f_t)>0\\ <0 & \text{if} \quad \varphi>\tilde{\varphi}\Rightarrow\Theta'(f_t)<0\end{cases}',$$

thus completing the proof. ■

The intuition behind Proposition 2 stems from the fact that an increase in the incidence of corruption, i.e., a higher $\Theta_t$, leads to a decline in the overall delivery of public goods. Consequently, it reduces the marginal utility of leisure, hence motivating parents to allocate more time towards their children's cultural indoctrination. As we have already established, a shift in the distribution of preferences regarding the strength of family ties will have an ambiguous effect on corruption. Given the manner through which utility-enhancing public goods affect the marginal utility of leisure, this ambiguity permeates the effect of $f_t$ on the parents' efforts to inculcate their offspring with preferences that are conducive to strong family ties.

The important message from the preceding analysis is that – in the context of this framework – the level of corruption is the underlying cause behind Type-$s$ parents' incentives to change the level of their children's cultural indoctrination, whenever the family values which they, themselves, uphold become more widespread among the population. In essence, this outcome reveals that the impact of family values on corruption may feed back to the very process through which these values are diffused in the first place. It is exactly for this reason that our equilibrium outcomes echo the ideas

[13] In the particular case where $f_t=1$, it is $Q_{s,t+1}=1$ as well. Thus, a more accurate characterisation of the result in (34) is $e_s(f_t)\in(0,1)$ for $f_t\in[0,1)$ and $e_s(f_t)=0$ for $f_t=1$.

of cultural complementarity and cultural substitution in the work of Bisin and Verdier (2001, 2008). Similar to their work, this process may have important implications for the dynamics of preferences regarding the strength of family ties. In order to analyse these dynamics, note that the evolution of the number of agents who have preferences for strong family ties is given by

$$f_{t+1} = \left[\widehat{e_{s,t}} + \left(1 - \widehat{e_{s,t}}\right) m_s(f_t)\right] f_t + m_w(f_t)(1 - f_t)\,. \tag{35}$$

According to (35), a fraction $\widehat{e_{s,t}} + \left(1 - \widehat{e_{s,t}}\right) m_s(f_t)$ of children born to agents with an inclination towards strong family ties, of whom there are $f_t$, will adopt similar preferences. Agents who do not have any inclination towards strong family ties, of whom there are $1 - f_t$, will not devote any effort towards their children's adoption of such preferences. Nonetheless, a fraction $m_w(f_t)$ of people born to these agents will still adopt a desire for strong family ties. This is because the fact that Type-$w$ parents do not devote any effort to instil a sense of family bonding in their children, does not necessarily mean that people, born to these parents, will not adopt such preferences. On the contrary, they may still adopt a desire for strong family ties through the oblique transmission and, therefore, enjoy utility from residing close to their family, even though their parents are indifferent about their offspring's choice of location.

Substituting (24), (25) and (34) in (35), the latter expression can be rewritten as

$$f_{t+1} = f_t[(e_s(f_t) + \bar{m})(1 - f_t) + f_t] = \lambda(f_t)\,, \tag{36}$$

such that

$$\lambda'(f_t) = (e_s(f_t) + \bar{m} + f_t e_s'(f_t))(1 - f_t) + f_t[2 - (e_s(f_t) + \bar{m})]\,. \tag{37}$$

From Eq. (36) we can see that $\widehat{f_L} = 0$ and $\widehat{f_H} = 1$ are steady state solutions since both of them are consistent with $f_{t+1} = f_t$. Moreover, Eq. (36) may be consistent with another, interior steady state solution $\widehat{f_M} \in (0,1)$ that solves $e_s\left(\widehat{f_M}\right) = 1 - \bar{m}$. In what follows, we shall assume that the conditions under which the interior steady state exists hold. Given this, we summarise our results in

**Lemma 1.** *Assume that* $\tilde{\varphi} > \hat{\varphi}$ *holds and recall that* $\varphi > \hat{\varphi}$. *When three steady state equilibria* $\widehat{f_L} = 0$, $\widehat{f_M} \in (0,1)$ *and* $\widehat{f_H} = 1$ *exist, then:*

*i.* *If* $\varphi < \tilde{\varphi}$, $\widehat{f_L}$ *and* $\widehat{f_H}$ *are locally asymptotically stable, whereas* $\widehat{f_M}$ *is unstable.*

*ii.* *If* $\varphi > \tilde{\varphi}$, $\widehat{f_M}$ *is asymptotically stable, whereas* $\widehat{f_L}$ *and* $\widehat{f_H}$ *are unstable.*

*Proof.* See the Appendix. ■

The main implication from Lemma 1 can be elucidated through

**Proposition 3.** *Let* $f_0 \in (0,1)$ *be the initial share of the population with preferences for strong family ties:*

*i.* *As long as family ties increase the incidence of corruption, the population will be culturally homogeneous in the long-run, as the distribution of preferences is sensitive to* $f_0$. *Particularly, the population will be gradually dominated by people who desire to retain strong ties with their families if* $f_0 > \widehat{f_M}$, *whereas the population will be gradually dominated by people who do not have such a desire if* $f_0 < \widehat{f_M}$.

*ii.* *As long as family ties reduce the incidence of corruption, the distribution of preferences is not sensitive to* $f_0$. *Specifically, the population will be culturally diverse with regard to their preferences on the strength of family ties, as the distribution of preferences will converge to* $\widehat{f_M} \in (0,1)$ *in the long-run.*

*Proof.* It follows from (22) and Lemma 1. ■

The previous result reveals that, when strong family ties are responsible for increased corruption, the long-run equilibrium is path-dependent (see the phase diagram in Figure 3). In other words, if the share of the population with either strong or weak preferences for retaining close ties with their families – parents and children – is high enough, then this situation is more likely to persist over time and such attitudes will eventually dominate in the long-run. The intuition rests primarily with the fact that corruption generates a complementarity between cultural indoctrination by parents and

the share of Type-$s$ agents in the population. Particularly, the presence of a large (small) number of people with preferences for strong family ties will induce Type-$s$ parents to devote more (less) time inculcating their offspring with similar attitudes, thus stimulating a further increase (decrease) of the population who abide by these family values. At the same time, more (less) young people born to Type-$w$ agents will actually adopt the Type-$s$ cultural trait through the oblique transmission. These mechanisms are conducive to path-dependence, hence the outcome in the first part of Proposition 3. On the contrary, when strong family ties are favourable to reduced corruption, the long-run equilibrium is unique (see the phase diagram in Figure 4). Here, the corruption-induced mechanism that imbues the relation between cultural indoctrination and the population share of Type-$s$ agents implies that this population share will be gradually increasing if $f_t$ is relatively low, but gradually decreasing if $f_t$ is relatively high.

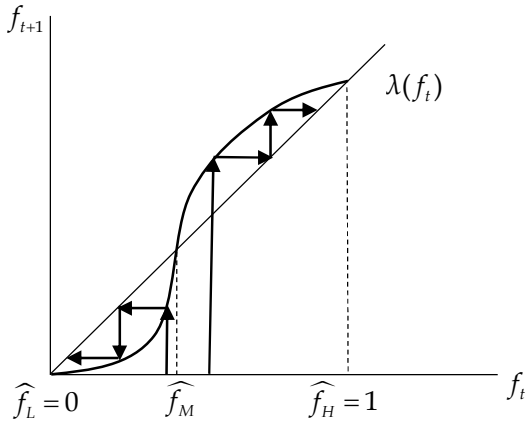


**Figure 3.** The dynamics of preferences for family ties when $\Theta'(f_t)>0$.

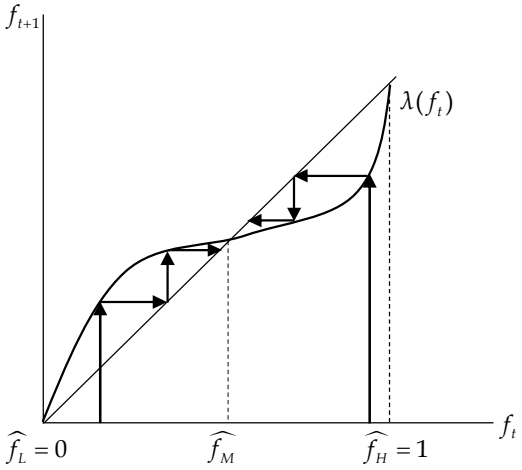


**Figure 4.** The dynamics of preferences for family ties when $\Theta'(f_t)<0$.

### 4.2 An Extended Scenario

In the baseline version of the previous section, the distribution of family values across the population affected the intensity of cultural indoctrination towards strong family ties *indirectly*, i.e., solely through the effect of this distribution on the incidence of corruption. This was because the learning externality embedded in the function $k(e_{s,t}, f_t)$ worked in such a way so that the two conflicting direct effects of $f_t$ on $\widehat{e_{s,t}}$ cancelled each other out. The purpose of this section is to relax this assumption and examine the model's results and implications in a setting which is qualitatively closer to the existing literature on cultural transmission, in the sense that – excluding any considerations regarding the impact of family ties on corruption – cultural indoctrination will be a cultural substitute to the population share of people who uphold preferences for strong family ties. In other words, for given quantity of public goods, $f_t$ will have a negative *direct* effect on $\widehat{e_{s,t}}$.

Let us replace Eq. (32) with the modified effort function

$$k(e_{s,t}, f_t) = (\kappa + f_t)(1 - f_t)e_{s,t}^2, \tag{38}$$

where $k_{f_t} = -(\kappa - 1 + 2f_t)e_{s,t}^2 < 0$ by virtue of $\kappa > 1$. In the same way as before, the learning externality still facilitates Type-$s$ parents in instilling a desire for strong family ties in their children. Nevertheless, solving the couple's problem under the effort function in (38), yields

$$\widehat{e_{s,t}} = \frac{\rho\varphi}{(\kappa + f_t)[x + a(f_t)]} = e_s(f_t). \tag{39}$$

In contrast to the corresponding solution in Eq. (34), now we can see that if we disregard the result in Proposition 1 for a moment and, instead, consider a case where $\Theta(f_t) = \Theta \ \forall f_t$ and $a(f_t) = a \ \forall f_t$, the parents' efforts to instil a desire for strong family ties in their children is decreasing in the population share of young agents who possess this behavioural trait. This is because the oblique transmission, through which a higher $f_t$ increases the likelihood that children will adopt a preference for strong family ties, dominates the effect of the learning externality in the determination of cultural indoctrination by Type-$s$ parents. Consequently, a higher $f_t$ induces parents to devote

less effort towards the indoctrination of their offspring. As we argued previously, this type of cultural substitution is (in qualitative terms) the outcome that emerges in the majority of existing theoretical work on cultural transmission (e.g., Bisin and Verdier 2001; Hauk and Sáez-Martí 2002; Michau 2013; Klasing 2014). In this case, similar to the influential work of Bisin and Verdier (2001), the dynamics of cultural transmission are qualitatively identical to those depicted on the phase diagram of Figure 4, as we argue in

**Corollary 1.** *When the relative strength of family ties does not have any effect on the incidence of corruption, the dynamics of intergenerational transmission converge to an interior long-run distribution of cultural traits that is not sensitive to the initial distribution of these traits among the population. In other words, the population will be culturally diverse with regard to their preferences on family values, due to the direct effect of cultural substitution.*

*Proof.* See the Appendix. ■

In our framework, however, the prevalence of strong family ties has implications for corruption. In order to analyse the outcomes that transpire under such circumstances, let us define the function

$$r(f_t) = (\kappa + f_t)[x + a(f_t)]. \tag{40}$$

Using (20) and (40), it is straightforward to establish that

$$r'(f_t) = \Omega_1 - \Omega_2(\kappa + 2f_t), \tag{41}$$

where

$$\Omega_1 \equiv x + gy[1 - \theta_w(1-z)],\ \Omega_2 \equiv gy(\theta_s - \theta_w)(1-z) \tag{42}$$

are composite terms such that $\Omega_1 > \Omega_2$. From (39)-(40), it follows that

$$e_s'(f_t) = \frac{-\rho\varphi r'(f_t)}{[r(f_t)]^2}. \tag{43}$$

Note that the dynamics of cultural traits are still given by Eq. (36). Once more, we shall focus our attention in circumstances where, in addition to $\widehat{f_L} = 0$ and $\widehat{f_H} = 1$, there exist interior equilibria, such that $f_{t+1} = f_t = \hat{f} \in (0,1)$. Formally, the possible outcomes are presented in

**Lemma 2.** *Assume that* $\tilde{\varphi} > \hat{\varphi}$ *holds and recall that* $\varphi > \hat{\varphi}$ *. When interior equilibria exist, then:*

*i. If either* $\varphi > \tilde{\varphi}$ *or* $\varphi < \tilde{\varphi}$ *and* $\Omega_1 / \Omega_2 > \kappa + 2$ *, there exist three steady state equilibria* $\widehat{f_L} = 0$ *,* $\widehat{f_M} \in (0,1)$ *and* $\widehat{f_H} = 1$ *.* $\widehat{f_M}$ *is asymptotically stable, whereas* $\widehat{f_L}$ *and* $\widehat{f_H}$ *are unstable.*

*ii. If* $\varphi < \tilde{\varphi}$ *and* $\Omega_1 / \Omega_2 < \kappa$ *, there exist three steady state equilibria* $\widehat{f_L} = 0$ *,* $\widehat{f_M} \in (0,1)$ *and* $\widehat{f_H} = 1$ *.* $\widehat{f_L}$ *and* $\widehat{f_H}$ *are locally asymptotically stable, whereas* $\widehat{f_M}$ *is unstable.*

*iii. If* $\varphi < \tilde{\varphi}$ *and* $\kappa + 2 < \Omega_1 / \Omega_2 < \kappa$ *, there exist four steady state equilibria* $\widehat{f_L} = 0$ *,* $0 < \widehat{f_{M,1}} < \widehat{f_{M,2}} < 1$ *and* $\widehat{f_H} = 1$ *.* $\widehat{f_{M,1}}$ *and* $\widehat{f_H}$ *are locally asymptotically stable, whereas* $\widehat{f_L}$ *and* $\widehat{f_{M,2}}$ *are unstable.*

*Proof.* See the Appendix. ■

In terms of the cultural evolution of preferences for family ties among the population, we present the implications in

**Proposition 4.** *Let* $f_0 \in (0,1)$ *be the initial share of the population with preferences for strong family ties:*

*i. When family ties reduce the incidence of corruption, the long-run distribution of preferences among the population is never sensitive to* $f_0$ *. In the long-run, the population will be culturally diverse with regard to their preferences on the strength of family ties.*

*ii. When family ties increase the incidence of corruption, there are circumstances where the long-run distribution of preferences among the population is sensitive to* $f_0$ *. Whether the population will be culturally homogeneous (i.e., dominated by people with preferences for either weak or strong family ties) or diverse depends on the initial distribution of preferences.*

*Proof.* It follows from (22) and Lemma 2. ■

Under some circumstances, the impact of family ties on corruption does not alter the cultural evolution of family values among the population, in comparison to the outcomes that are summarised in Corollary 1. These are circumstances where cultural indoctrination is decreasing in the population share of agents who uphold values conducive to strong family ties, either because such family values mitigate the incidence of corruption, thus reinforcing the direct negative impact of $f_t$ on $e_s(f_t)$, or because the latter effect dominates any positive impact of family ties on corruption. In other words, the dynamics of cultural transmission look identical to the phase diagram of Figure 4.

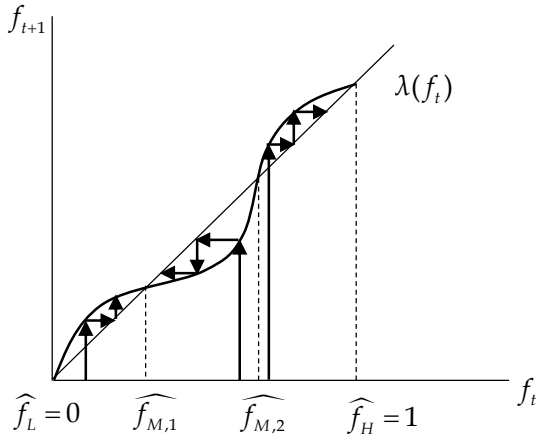


**Figure 5.** The dynamics of preferences for family ties when $e_s(f_t)$ is non-monotonic

Nevertheless, there are other circumstances, which are summarised in parts (ii)-(iii) of Lemma 2 and part (ii) of Proposition 4, where the cultural evolution of family values leads to outcomes that are sensitive to the initial distribution of these values among the population. These may occur when strong family ties prompt an increase in the level of corruption. One possibility is that the dynamics look identical to the ones depicted on the phase diagram of Figure 3. In this case, despite the fact that – in the absence of corruption – there is a mechanism that induces some sort of substitution between cultural indoctrination and the number of agents who are favourable to strong family ties, the reinforcing effect of family ties on corruption is strong enough to reverse this relation completely, thus generating the mechanism that is ultimately responsible for the emergence of path-dependent outcomes. Another possibility is illustrated on the

phase diagram of Figure 5. In this case, the cultural substitution that imbues the relation between indoctrination and the share of the population with preferences for strong family ties dominates for relatively low values of $f_t$, but is dominated for relatively high values of $f_t$. Consequently, $\widehat{f_{M,2}}$ acts as a threshold that determines whether preferences for strong family ties will become dominant, or the population will be culturally diverse in the long-run.

The preceding analysis and results have revealed the outcomes that we present formally in

**Corollary 2.** *When family ties prompt an increase in corruption, the dynamics of intergenerational transmission converge to a long-run distribution of cultural traits that may be sensitive to the initial distribution of these traits among the population, despite the direct effect of cultural substitution. In other words, the impact of family ties on corruption renders the initial distribution of preferences for family ties critical in circumstances where this initial distribution would be otherwise irrelevant.*

*Proof.* It follows from the preceding analysis and discussion. ■

Overall, we have demonstrated that the results and implications of our original framework can survive in a modified version, where, due to the strength of the oblique transmission, the prevalence of a cultural trait across the population is a substitute to parents' incentives in inculcating their children with the same trait. Our analysis highlights the point that the presence of additional, indirect mechanisms – in our case, the incidence of corruption – through which the distribution of cultural traits can affect the dynamic process of cultural transmission can enrich the possible outcomes that emerge from this process. Indeed, the way through which corruption and family ties become interdependent, determines the dynamics of preferences for family ties across the population.

# 5 Conclusions

The objective of this study was twofold. Firstly, to investigate the role of the family ties-corruption nexus for the intergenerational transmission of preferences regarding the relative strength of conjugal family ties. Secondly, to use the results as a platform for extracting more general implications about the mechanisms that permeate the process of cultural transmission, as well as the long-run outcomes regarding the distribution of preferences and cultural traits among the population. We showed that when family ties decrease the incidence of corruption, then the time that parents devote for instilling a desire for strong family ties in their children is decreasing in the share of the population who have similar preferences for strong family ties. In this case, the dynamics of cultural transmission converge to a unique, interior equilibrium indicative of cultural diversity with regard to the distribution of different family values among the population. We also showed that when family ties increase the incidence of corruption, then the time that parents devote for inculcating their children with a desire to retain strong family ties is increasing in the share of the population who have similar preferences. In this scenario, the dynamics of cultural transmission may lead to path-dependent outcomes: Whether one of the cultural traits (i.e., weak or strong family ties) will be uniformly adopted in the long-run, or the population will be culturally diverse, depends on the current distribution of preferences for family ties among the population. Interestingly, the relation between family ties and corruption sets in motion mechanisms that may lead to path-dependence and cultural homogeneity, even though the oblique transmission is a cultural substitute of parents' cultural indoctrination of their children.

Our study concentrated on conjugal family ties, therefore it kept a tight focus on factors such as bonding, attentiveness and closeness among members of the immediate family as a means of capturing the strength of family ties. Nevertheless, once we expand our view of family ties to the extended family, we can identify additional factors that seem pertinent to corruption. One such factor is nepotism. For example, imagine a framework where the probability of securing employment in the public sector, and therefore having greater opportunities for rent-seeking through corruption, is increased when there are close ties with family members who are employed in the public sector. This is a framework that can certainly generate interesting mechanisms on the relation

between (extended) family ties and corruption, as well as on the dynamics of preference transmission regarding the relative strength of these ties. This is a research endeavour that is certainly worth pursuing in the future.

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# Appendix

**Proof of Lemma 1**

Substituting $\widehat{f_L}=0$ and $\widehat{f_H}=1$ in (37) yields

$$\lambda'(0)=e_s(0)+\bar{m}\,,\ \lambda'(1)=2-e_s(1)+\bar{m}\,. \tag{A1}$$

Now write (36) in terms of the growth rate

$$\frac{f_{t+1}}{f_t}-1=\frac{\lambda(f_t)}{f_t}-1=(1-f_t)\varsigma(f_t)=\psi(f_t)\,, \tag{A2}$$

where

$$\varsigma(f_t)=e_s(f_t)-(1-\bar{m})\,. \tag{A3}$$

First consider the case where $\varphi<\tilde{\varphi}$, meaning that $e_s'(f_t)>0$, and assume that $e_s(0)<1-\bar{m}<e_s(1)$. It follows that there exists $\widehat{f_M}\in(0,1)$ such that $\varsigma\left(\widehat{f_M}\right)=0\Rightarrow\psi\left(\widehat{f_M}\right)=0$ and, by virtue of (A3), $\varsigma'(f_t)>0\Rightarrow\varsigma'\left(\widehat{f_M}\right)>0$. From (A2), we can derive

$$\psi'(f_t)=-\varsigma(f_t)+(1-f_t)\varsigma'(f_t)\,, \tag{A4}$$

and substitute $\widehat{f_M}\in(0,1)$ to deduce that this is not a stable steady state because $\psi'\left(\widehat{f_M}\right)=\left(1-\widehat{f_M}\right)\varsigma'\left(\widehat{f_M}\right)>0\Rightarrow\lambda'\left(\widehat{f_M}\right)>1$. However, combining $e_s(0)<1-\bar{m}<e_s(1)$ with (A1) reveals that $\widehat{f_L}=0$ and $\widehat{f_H}=1$ are stable steady state equilibria because $\lambda'(0),\lambda'(1)\in(0,1)$.

Now consider the case where $\varphi > \tilde{\varphi}$, meaning that $e_s'(f_t) < 0$, and assume that $e_s(1) < 1 - \bar{m} < e_s(0)$. Once more, there exists $\widehat{f_M} \in (0,1)$ such that $\varsigma\left(\widehat{f_M}\right) = 0 \Rightarrow \psi\left(\widehat{f_M}\right) = 0$. In this case, however, (A3) reveals that $\varsigma'(f_t) < 0 \Rightarrow \varsigma'\left(\widehat{f_M}\right) < 0$. From (A2), we can infer that $\widehat{f_M} \in (0,1)$ is a stable steady state because $\psi'\left(\widehat{f_M}\right) = \left(1 - \widehat{f_M}\right)\varsigma'\left(\widehat{f_M}\right) < 0 \Rightarrow \lambda'\left(\widehat{f_M}\right) < 1$. Furthermore, we can use $e_s(1) < 1 - \bar{m} < e_s(0)$ with (A1) to reveal that $\widehat{f_L} = 0$ and $\widehat{f_H} = 1$ are unstable because $\lambda'(0), \lambda'(1) > 1$. ■

**Proof of Corollary 1**

When $a(f_t) = a \ \forall f_t$, Eq. (39) becomes $e_s(f_t) = \dfrac{\rho\varphi}{(\kappa + f_t)(x + a)}$, meaning that $e_s'(f_t) < 0$. Therefore, we can appeal to the proof of Lemma 1 (for the case where $e_s'(f_t) < 0$) to complete this proof as well. ■

**Proof of Lemma 2**

If either $\varphi > \tilde{\varphi} \Rightarrow \theta_s < \theta_w$ or $\varphi < \tilde{\varphi} \Rightarrow \theta_s > \theta_w$ and $\Omega_1 / \Omega_2 > \kappa + 2$, then (41)-(43) reveal that $e_s'(f_t) < 0$. If $\varphi < \tilde{\varphi} \Rightarrow \theta_s > \theta_w$ and $\Omega_1 / \Omega_2 < \kappa$, then (41)-(43) reveal that $e_s'(f_t) > 0$. Therefore, we can appeal to the proof of Lemma 1 to provide the proof for parts (i) and (ii) of Lemma 2 as well.

Now, consider $\varphi < \tilde{\varphi}$ and $\kappa + 2 < \Omega_1 / \Omega_2 < \kappa$. Under this scenario, (41)-(43) reveal that

$$e_s'(f_t) \begin{cases} < 0 & \text{if} \quad f_t < \breve{f} \\ > 0 & \text{if} \quad f_t > \breve{f} \end{cases}, \tag{A5}$$

where $\breve{f} \equiv [(\Omega_1 / \Omega_2) - \kappa] / 2$. As long as $e_s(0), e_s(1) > 1 - \bar{m} > e_s\left(\breve{f}\right)$ holds, there are actually four steady state equilibria $\widehat{f_L} = 0$, $\widehat{f_{M,1}}, \widehat{f_{M,2}} \in (0,1)$ such that $\widehat{f_{M,1}} < \widehat{f_{M,2}}$, and $\widehat{f_H} = 1$. By virtue of (A2), (A3) and (A5), the dynamics of $f_t$ are characterised by

$$\frac{f_{t+1}}{f_t}-1\begin{cases}>0 & \text{if} \quad f_t \in \left(0, \widehat{f_{M,1}}\right) \\ <0 & \text{if} \quad f_t \in \left(\widehat{f_{M,1}}, \widehat{f_{M,2}}\right) \\ >0 & \text{if} \quad f_t \in \left(\widehat{f_{M,2}}, 1\right)\end{cases}, \tag{A6}$$

hence revealing that the equilibria $\widehat{f_L}$ and $\widehat{f_{M,2}}$ are unstable, whereas $\widehat{f_{M,1}}$ and $\widehat{f_H}$ are locally asymptotically stable.[14] ■

[14] In this scenario, multiple equilibria can also emerge if $e_s(0) < 1-\bar{m} < e_s(1)$ or $e_s(0) > 1-\bar{m} > e_s(1)$. In the former case, the interior equilibrium is unstable; in the latter case, it is stable.