

# **Tales from the South Pacific: Do Precolonial Institutions Explain Ethnic Fractionalization? (April 2015)**

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## **Abstract**

This article links precolonial institutions and ethnic fractionalization. First, a theoretical link between precolonial jurisdictional hierarchy and ethnic fractionalization is established. Specifically, politically centralized precolonial societies are hypothesised to have lower current levels of ethnic fractionalization than those that were decentralized. Then, using principal component analysis to distil the five major ethnic fractionalization indices into one measure, cross country econometric analysis is undertaken. Precolonial institutions are found to explain almost half of the current variation of ethnic fractionalization in a sample of postcolonial states. Following an in depth analysis of precolonial institutions and ethnic fractionalization in the south pacific countries of Papua New Guinea, Tonga, and Samoa, evidence is presented showing that the remnants of precolonial institutions continue to shape notions of ethnicity. These findings are important for policy makers wishing to alter the level of ethnic fractionalization and for those who wish to better understand the underlying links between ethnic fractionalization and economic development.

**JEL Classifications:** J15, N40, N47, Z13, Z10

**Key words:** Precolonial Institutions, Ethnic Fractionalization, Tribalism, Principal Component Analysis.

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## Introduction

The link between ethnic diversity and economic development is well established: countries (and regions within countries) with higher levels of ethnic fractionalization are generally much poorer. However, the causes of ethnic fractionalization are not yet established, despite important recent inroads by Michalopoulos (2012) and Ahlerup and Olsson (2012).

Understanding the drivers of ethnic fractionalization is vital for two reasons. First, it is a necessary first step for those who wish to change the level of fractionalization in their countries, whether to boost economic development or for some other purpose. This is especially relevant for many developing countries that must grapple with high rates of ethnic fractionalization, or what Geertz (2001: 260) termed ‘primordial attachments’. Second, by better understanding the drivers of ethnic fractionalization, its link with economic development can be better understood. For instance, is ethnic fractionalization an impediment to growth *per se* or is it simply a manifestation of more underlying phenomena? Unless these underlying phenomena can be established, this question cannot be adequately answered.

Derived from the Greek word *ethnos*, meaning a people or a nation, the concept of ethnicity has divided social scientists, sometimes with considerable passion. While there seems to be broad agreement that ethnic groups usually share a common sense of historical origin and often also a common language, religious belief, or culture, there remains disagreement over how it is measured and its drivers.<sup>2</sup> Indeed, there are numerous indices that emphasise different aspects of ethnicity and that use different data sources. Another area of contention relates to the degree that ethnicity is deemed to be ‘constructed’ or ‘given’. Some suggest powerful prehistoric forces are largely at play, while others highlight the ability of individuals, institutions and conflicts to meld and fashion ethnic groups and ultimately the degree of ethnic fractionalization that is found.<sup>3</sup> This article aims to make a contribution to the literature both in terms of how ethnicity can be measured for empirical analysis and what drives it.

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<sup>2</sup> See Stone and Piya (2007) an overview of the concept and how the term differs from race.

<sup>3</sup> Witnessing the process of decolonisation first hand, Geertz (2001: 259-61) writing in the 1960s concluded that the new postcolonial states were ‘abnormally susceptible’ to ‘a direct conflict between primordial and civil sentiments’.

This article builds on the recent analysis of Michalopoulos (2012) and Ahlerup and Olsson (2012). Michalopoulos (2012) has highlighted the importance of geography. He hypothesises that different land endowments gave rise to locational specific human capital that led to the formation of localised ethnic groups. Consistent with his hypothesis, he finds a causal link between variations in elevation and land quality and ethnic fractionalization. Providing a model of collective good provision where the productivity of group members falls with respect to geographic and cultural distance, Ahlerup and Olsson (2012) contend that random genetic and cultural drift among prehistoric populations accumulates over time. Allowing for discontinuities, they show that at some point there are net gains from some members breaking away from the original group and forming their own group. Using genetic data, they construct a measure of duration of human settlement (Origtime) which they show to have a strong positive association with linguistic fractionalization.

This article investigates the link between precolonial institutions and ethnic fractionalization. This is done by using both cross country econometric analysis and studying the relationship in the South Pacific states of Papua New Guinea, Tonga, and Samoa. It is shown that ethnic fractionalization is inextricably linked to precolonial jurisdictional hierarchy both theoretically and empirically. The remainder of this paper is as follows. First there is a brief review of the ethnic fractionalization and precolonial institutions literature. Then there is a discussion of why precolonial institutions should drive measures of ethnic fractionalization, and the factors that may mitigate against this fundamental relationship identified. After outlining the main ethnic fractionalization indices, principal component analysis is undertaken to distil these indices to one measure in order to undertake cross country econometric analysis that links precolonial institutions to ethnic fractionalization. This is followed by an in-depth analysis of precolonial institutions and ethnic fractionalization in the three South Pacific island states identified above. These are chosen given their extreme difference in both degree of ethnic fractionalization and precolonial institutions. It is hoped that this focus and their extreme difference will make the relationships more easily identified and the direction of the relationship identifiable. This is followed by a discussion of the combined cross country and country specific results, and a conclusion.

### **Linking Precolonial Institutions and Ethnic Fractionalization**

It is hypothesised that precolonial institutions are a key driver of current levels of ethnic fractionalization in postcolonial states. Before the rationale for this relationship is outlined,

the literature on ethnic fractionalization and precolonial institutions is briefly reviewed with a focus on the transmission channels that have been put forward to link each phenomenon to economic development. After this review, it is evident that both literatures highlight the importance of *tribalism* in linking their measures to economic development: tribal preferences in the ethnic fractionalization literature and tribal institutions in the precolonial institutions literature.

The literature linking measures of ethnic fractionalization to economic development is highly cited and well known (see Mauro 1995, Easterly and Levine 1997, and Alesina, Baqir and Easterly 1997, La Porta et al 1999, Alesina et al 2003, and Montalvo and Reynal-Querol 2005). It finds that higher levels of fractionalization are related to lower levels of economic development, and there have been a number of transmission channels proposed to explain this statistical relationship. Mauro (1995) used ethno-linguistic fractionalization as an instrument for corruption, which in turn was related to investment. Easterly and Levine (1997) suggested that ethnic diversity encourages the adoption of growth retarding rent seeking policies (that favour one ethnic group at the expense of another) and that fractionalization can make it more difficult get political consensus for growth promoting public goods. Similarly, Alesina et al (1999) suggested that different ethnic groups have different preferences in terms of public good provision and therefore rationally choose to devote more resources to private consumption.<sup>4</sup> While these transmission channels are all different to some degree, they can all be sourced back to the creation of ‘us’ and ‘them’ preferences that leads to the suboptimal functioning of (primarily) state institutions (see Alesina and La Ferrara 2005 for a review of this literature).

Precolonial institutions have also been shown to be closely related to current economic development outcomes (see Gennaioli and Rainer 2007, Ziltener and Müller 2007, Michalopoulos and Papaioannou 2013, 2014, and Fenske 2013, 2014).<sup>5</sup> More specifically,

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<sup>4</sup> Alesina, Baqir and Easterly (1997) constructed a measure for ethnic fractionalization for local subdivisions in the United States using census data. The index was derived for cities, counties, or metropolitan areas based on the census classifications: ‘White, Black, Asian and Pacific Islander, American Indian, Other.’

<sup>5</sup> In terms of what drives precolonial institutions, Fenske (2013, 2014) has highlighted the importance of geographic factors. He has shown that ecological diversity is a key driver in the formation of precolonial states. He argues that gains from trade encourage the formation of states by making them more attractive than other forms of rent extraction through higher taxation revenues. He has also shown a strong link between land quality and property rights regimes in Africa.

societies that were less politically centralized in precolonial times have been shown to have lower levels of economic development in the postcolonial period (or during colonial period as well?). While European colonisation had many profound effects, overall it was limited both in terms of geographic reach and time. In relation to geographic reach, Michalopoulos and Papaioannou (2013:115) highlight the inability of many colonial administrations to ‘broadcast power beyond the capitals’ which led citizens to continue to rely on precolonial institutions. In terms of duration of colonial rule, Ziltener and Künzler’s (2013) show that even with some notable outliers (e.g. Angola 469 years, Mozambique 406 years, and South Africa 342 years) European colonisation was relatively short when compared to length of human settlement; with the average period of colonisation being a little more than 130 years. However, even if remnants of precolonial institutions persist, explaining their link to current levels of economic development is another matter. Herbst (2000) suggests that local chiefs were more accountable in politically centralized societies and that such societies already had wealth generating institutions in place (including more formal and stable property rights regimes). On this, Ziltener and Müller (2007:382-3) conclude that when ‘state control and political legitimacy were already established by local rulers before the arrival of colonizers, postcolonial nation-building can reach back to, and modernize these autochthonous mechanisms instead of imposing new state institutions upon tribal structures’ and that wealth generation institutions ‘appear more acceptable when they are in line with historically rooted cultural identity’.

In summary, the ethnic fractionalization literature has focused on the generation of ‘us’ versus ‘them’ preferences and how these impede the functioning of state institutions, while the precolonial institutions literature highlights the persistence of non-state institutions, most notably how persistent tribal institutions are incompatible with contemporary state institutions and how precolonial state institutions are compatible (and reinforce) contemporary state institutions. It is hypothesised here that precolonial institutions are in fact a key driver of ethnic fractionalization. Indeed, tribalism is synonymous for ethnicity and ethnic fractures, something both sets of literature are explicitly capturing. The claim is made below that precolonial institutions drive ethnic fractionalization. Of course, in making this claim it is acknowledged that they are not the only driver of ethnic fractionalization. This claim does not also rule out the possibility that ethnic differences helped shape precolonial institutions in the first place. Indeed, it is suggested as that both measures are so closely

related to one another that the only way of establishing the direction of the relationship, is by drawing on country specific case studies.

To clarify why precolonial institutions should be inextricably linked to ethnic fractionalization, it is first necessary to outline the most commonly used measure of precolonial institutions in the literature: 'jurisdictional hierarchy beyond the local community'. The categorical variables of this measure are: 0 - No political authority beyond community (clans without a designated village chief); 1 - One level (petty chiefdoms); 2 - Two levels (paramount chiefdoms); 3 - Three levels (states or kingdoms); and 4 - Four levels (more complex states with multiple tiers of governance). This measure is derived from Murdock's (1969) *Ethnographic Atlas* which contains quantitative measures of various social, economic and institutional variables for 1270 societies across the world. Murdock (1969:52) explicitly aimed to exclude anything 'imposed' by colonial regimes from his measurements that were sourced from descriptions of anthropologists during colonial times, mainly between 1890 and 1950.

To outline how precolonial institutions and ethnic fractionalization are linked, it is useful to consider two post-colonial states with very different precolonial institutions as depicted in Figure 1 below. One postcolonial state (State P) was a collection of small independent communities prior to colonisation, while the other was ruled by a king (State T). By definition, State P would achieve a low score in terms of Murdock's measure for Jurisdictional Hierarchy, either 0 or 1. It would achieve a score of 1 if there were chiefs in charge of the local communities 0 if even more decentralized institutions were in place, such as multiple leaders sharing and competing for power. In the case of state T, again by definition, this would achieve a high jurisdictional hierarchy score. In the case depicted in Figure 1, it would achieve a score of 3 due to a layer of paramount chiefs (PC) between the king (K) and local chiefs. Note that it would achieve a 4 if there was another layer of governance between the monarch and the local leadership. We can say with some certainty that State P will have higher levels of ethnic fractionalization, with its multitude of independent communities, and with no central (or even regional) government in place. In contrast, postcolonial State T with a history of nationhood dating back to pre-colonial times (and where its people shared a common monarch) should be less fractionalized by this very fact. That is, in State T the populace share a common history and a common identity dating back to precolonial times. If the four communities in State P were separate groups of equal size it would have a high ethnic fractionalization score of 0.75. If in State T the king ruled a

united people, it would have a low ethnic fractionalization score of 0.<sup>6</sup> Therefore, it is proposed that precolonial institutions and ethnic fractionalization should have a direct relationship to one another, where jurisdictional hierarchy is inversely related to current levels of ethnic fractionalization.

<Insert Figure 1>

There are two main explanations for how these precolonial jurisdictions first developed. The first explanation suggests an endogenous process where autochthonous groups were formed by communities aggregating or where new communities broke away from larger ones to form their own new jurisdictions. The reasons for the formation of autochthonous aggregated jurisdictions could occur along the lines as outlined by Alesina, Baqir and Hoxby (2004) where the benefits of economies of scale are traded-off with the costs of greater heterogeneity in determining group size. Where there are net benefits of amalgamation, a common ruler could be appointed to administer this new combined jurisdiction. Another possible endogenous process is that presented by Ahlerup and Olsson (2012). As outlined above, they suggest that cultural drift occurs naturally over time and that this increases the net benefits to peripheral members of forming a new group. While their model does not address this question, presumably this new group would have less or the same levels of jurisdictional hierarchy. The second explanation for the formation of precolonial institutions suggests a largely exogenous process where an external actor (in the pre-European colonial period) imposed their rule on collections of previously independent communities through conquest, and put in place jurisdictional hierarchies to secure control. This shared history of common governance may forge a new common and persistent ethnic identity.<sup>7</sup> Whether precolonial jurisdictions were formed endogenously or exogenously, it is suggested that they should continue to play a large role in explaining and forming current levels of ethnic fractionalization.

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<sup>6</sup> The formula for computing ethnic fractionalization indices, is  $1 - \sum_{i=1}^I (\frac{n_i}{N})^2$ ,  $i = 1, \dots, I$ . Where  $n_i$  is the number of people in the  $i$ th group,  $N$  is the total population, and  $I$  is the number of ethnic groups

<sup>7</sup> Related to this is the Huntington hypothesis that suggests conflict is a key driver of ethnic and religious identities (see Fletcher and Iyigun 2010).

There are, however, at least three reasons to expect the relationship between precolonial jurisdictional hierarchy and ethnic fractionalization to be an imperfect one. First, ethnic groups might have developed during the colonial or post-colonial eras, and therefore bear little relation to precolonial times. There is a large literature documenting how colonial administrations and their political descendants amplified, or even invented, ethnic divisions for their own gain.<sup>8</sup> The second reason to expect an imperfect relationship is that it is well known that the boundaries of many post-colonial states bear little resemblance to the boundaries of precolonial societies. The final reason is that European colonisation and conquest often led to large migrations. Two of the most notable mass migrations were those generated by slavery (mainly from Africa to the Americas) and European settlement (mainly to the Americas, but also Australia, New Zealand, and pockets within Africa and Asia). The sheer magnitude of these migrations has sometimes resulted in precolonial ethnic groups becoming a small minority in the ‘new world’ state they are situated.<sup>9</sup>

### **Empirical Analysis**

To determine whether precolonial institutions are main driver of ethnic fractionalization in the postcolonial world, the empirical analysis consists of three components. First is discussion of the precolonial and ethnic fractionalization data. Any empirical analysis that aims to link precolonial jurisdictional hierarchy and ethnic fractionalization is complicated by the existence of multiple fractionalization measures. Therefore, principal component analysis is performed to retain as much as possible of the variation present in all of the indices into a single measure. Following this is a cross country econometric analysis into the key explainers of ethnic fractionalization, with a special focus on the role of precolonial jurisdictional hierarchy. This is followed by a case study of precolonial institutions and ethnic fractionalization in Papua New Guinea, Tonga, and Samoa.

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<sup>8</sup> For instance, Laitin (1985) provides evidence that the British in Nigeria revived and promoted identification with ancestral cities (while simultaneously discouraging religious antagonisms) – and the colonial practices concerning the treatment of pre-existing ethnic distinctions between Hutus and Tutsis in Rwanda is well documented. Of course, the tactic of reviving or exacerbating pre-existing ethnicities was (and is) not the sole purview of colonial administrations.

<sup>9</sup> Native Americans now make up a little over one per cent of the population of the United States while Aboriginals now make up approximately three per cent of the Australian population. Colonisation also saw some large migrations among those who were colonised (e.g. approximately 40 per cent of the Fijian population have their ancestry in British India).

## *Data Analysis*

### Precolonial Institutions

In line with the precolonial institutions literature, the measure chosen is jurisdictional hierarchy beyond the local community (as outlined above). This is sourced from Müller et al (2000) who constructed precolonial data at the country level, by weighting the precolonial jurisdictional hierarchy score for each ethnic group by their population. This population weighted measure is a continuous variable with the range of 0 to 4, where the lower the degree of centralized authority the closer the measure is to zero. This largely deals with the fact that current state boundaries bear little resemblance to precolonial borders. In an effort to further isolate precolonial institutions, and the role of mass migrations, Müller et al's (2000) dataset also excludes Europe and the European settler colonies and the whole of the Americas. Specifically, it only includes countries where people of European origin make up less than 10 per cent of the population.<sup>10</sup> In total, they provide precolonial institutions country level data for 86 current African, Asian and Pacific countries.

### Ethnic Fractionalization and Principal Component Analysis

There are numerous ethnic fractionalization indices that (legitimately) emphasise different aspects of ethnicity or use different data sources. Taylor and Hudson (1972) were the first to calculate a cross country ethnolinguistic fractionalization index, using data from the Atlas Narodov Mira (Atlas of Peoples of the World).<sup>11</sup> Their index, and all the fractionalization indices, measures the probability that two randomly selected individuals in a country will belong to different groups. Therefore, the index increases both in the number of ethnic groups and the more equal they are in size. The Taylor and Hudson (1972) measure has been used widely since, including Mauro (1995) and Easterly and Levine (1997). In addition to using their data, Easterly and Levine (1997) also constructed an aggregate measure that included four other indices, which was also used and augmented by La Porta et al (1999).<sup>12</sup>

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<sup>10</sup> The only exception is South Africa (to incorporate the whole of Africa in their dataset) with 18 per cent of the population. Dependent territories, city states, and micro-countries are also excluded.

<sup>11</sup> The Atlas Narodov Mira (ANM) was constructed in 1960 by the Miklukho-Maklai Ethnological Institute in the then Soviet Union using a database of the world's most widely used 1600 languages.

<sup>12</sup> This index included two alternative indices of linguistic diversity that were also listed by Taylor and Hudson (1972); compiled by Roberts (1962) and Muller (1964), and two additional measures of linguistic diversity constructed by Gunnemark (1991): the first measures the share of the population that do not speak the official

Since then, some authors have constructed their own ethnic fractionalization measures conscious of the many of the complexities surrounding the concept, including its apparent ability to mutate, and to utilise different data sources.<sup>13</sup> Alesina et al (2003) developed new and updated cross-country indices that aimed to separate ethnic, religious, and linguistic heterogeneity. In relation to ethnicity, while acknowledging that it ‘remains a rather vague and amorphous concept’ they set out to construct a measure more closely related to ‘racial’ characteristics than language (Alesina et al 2003:160).<sup>14</sup> Fearon (2003) also produced his own measures for ethnic and cultural fractionalization, highlighting the salient ethnic marker at the country level and the linguistic and temporal nature of these concepts.<sup>15</sup> Montalvo and Reynal-Querol (2005) also constructed an alternative measure for ethnic fractionalization (and polarization) using a lower level of disaggregation sourcing their data primarily from an alternative data source (the World Christian Encyclopedia).

As can be seen in Table 1, all the indices are highly correlated with one another. The correlation coefficients (for this sample of countries) range from a high of 0.94 for Taylor and Hudson’s (1976) index (sourced from data from Atlas Narodov Mira) and La Porta et al (1999) composite index, to a low of 0.67 between La Porta et al’s (1999) index and Alesina’s (2003) index.<sup>16</sup>

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language of the country at home (as observed in 1990) and the second measures the share of the population not speaking the most widely used language.

<sup>13</sup> Alesina et al (2003) note that prior to the 1991 civil war Somali society was characterised as being relatively homogenous, but that during and after the war, it has been characterised as being highly fractionalized along pre-existing clan lines.

<sup>14</sup> This distinction can be important for the Americas where ethnic groups are often divided by ‘race’ rather than language. Their main data source for identifying ethnic groups was the *Encyclopaedia Britannica* in 2001. It should be noted that the concept of race (that is, distinct groups of genetically similar people) is now largely discredited in the sociology and human biology literature (see Stone and Piya 2007). Alesina et al (2003) source their data from the Encyclopedia Britannica in 2001, the CIA’s World Factbook, Levinson (1998), and Minority Rights Group International.

<sup>15</sup> He used a number of sources to construct his indices including the CIA’s World Factbook, the Encyclopaedia Britannica, Ethnologue, Library of Congress Studies, and continental experts.

<sup>16</sup> For the full set of countries in each of the indices the correlation coefficients are 0.76 for Alesina et al (2003), 0.75 for Fearon (2003), and 0.86 for Montalvo and Reynal-Querol (2005).

**<Insert Table 1>**

In terms of the relationship between precolonial jurisdictional hierarchy and ethnic fractionalization, it can also be seen from Table 1 and Figures 2, 3 and 4, there is a clear negative correlation for this set of post-colonial countries. However, the correlation coefficients vary considerably between the different measures of ethnic fractionalization, ranging from -0.48 with Taylor and Hudson's (1976) index to -0.75 with Fearon's (2003) index. Indeed, as can be seen from Table 1, Fearon's (2003) index of ethnic fractionalization has a higher absolute correlation coefficient with the index of precolonial jurisdictional hierarchy than it does with three of the other ethnic fractionalization indices.

**<Insert Figure 2>**

**<Insert Figure 3>**

**<Insert Figure 4>**

While the different ethnic fractionalization indices are highly correlated with one another, they are far from identical, especially given that they are aiming to measure the same phenomenon. Furthermore, these differences have consequences; while all the ethnic fractionation indices are correlated with the index for precolonial jurisdictional hierarchy, there is considerable variation. However, given that all these indices have sound conceptual underpinnings and data sources, choosing one over another would contain an element of arbitrariness or perhaps raise concerns over selection bias. However, using all 5 indices in the econometric analysis runs the risk over overcomplicating and obscuring the analysis. Therefore principal component analysis (PCA) is employed to condense the information contained in these different ethnic fractionalization indices into one composite measure with capturing the maximum possible variance from the original indices. Given that the indices have different country coverage, the main drawback from this exercise is a reduction in the number of observations. Therefore, the main econometric results for each of the individual indices are also contained in table 1A in the Appendix and are broadly consistent (especially in terms of precolonial jurisdictional hierarchy).

Given an  $N$  number of ethnic fractionalization indices,  $N$  principal components can be computed. Each principal component is a linear combination of the original ethnic fractionalization indices, with coefficients equal to the eigenvectors of the correlation or covariance matrices. The principal component (PC1) is computed by:

$$PC1 = b_{11}(x_1) + b_{12}(x_2) + \dots + b_{1n}(x_n) \quad (1)$$

where  $b_{1n}$  is the regression coefficient for the  $N$ th index that is the eigenvector of the covariance matrix between the indices and  $X_n$  is the value of the  $N$ th index (Jolliffe 2002).

Table 2 below presents the eigenvalue proportions of variance which provides guidance on the optimal number of components that should be retained. The sum of the eigenvalues of the correlation matrix is equal to the number of variables (in this case 5) as each index contributes one unit of variance to the dataset. As can be seen below, the eigenvalue for the first component is very high, at 4.09, while the others are well below 1. This result suggests that principal component analysis is particularly well suited for the purposes of reducing the 5 ethnic fractionalization indices into one measure (the principal component). It can also be seen from the third column of Table 2 that the proportion of variation explained by the first component is very high, at 0.82.<sup>17</sup>

**<Insert Table 2>**

Table 3 presents the calculated eigenvectors (or loadings) for the 5 precolonial indices. It is by these eigenvectors that PC1 is obtained in Equation (1) and they therefore represent the correlation between PC1 and the original ethnic fractionalization indices. As can be seen all the indices are evenly weighted.

**<Insert Table 3>**

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<sup>17</sup> The use of the first component only is also consistent with the Kaiser-Guttman rule states that only factor components with eigenvalues greater than 1 should be retained.

## Control Variables

As outlined in the introduction Michalopoulos (2012) and Ahlerup and Olsson (2012) have made important contributions in unearthing key determinants of ethnic fractionalization. Specifically, Michalopoulos (2012) highlighted the importance of variations in elevation and climatic suitability of agricultural land, while Ahlerup and Olsson (2012) have highlighted the importance of the duration of continuous human settlement. These studies also found a number of controls to be significant: absolute latitude, mean elevation, mean climatic suitability of agricultural land, distance from the sea, average precipitation, and colonial rule.

### *Econometric Analysis*

A list of all the variables, with definitions and sources, can be found in Table 4. A correlation matrix of the controls is contained in Table 4. As can be seen, there is a strong correlation between precolonial jurisdictional hierarchy (Precolonial), length of human settlement (Origtime), and absolute latitude with the ethnic fractionalization principal component (PC1). Furthermore, it can also be seen that there is a strong pair-wise correlation between ethnic fractionalization and length of human settlement. This relationship between will be discussed below. It is also evident that there are also strong correlations between a number of the geographic variables, especially between latitude, climate and precipitation. Table 5 contains the summary statistics of each of the variables used in the regressions.

**<Insert Table 3>**

**<Insert Table 4>**

**<Insert Table 5>**

The OLS regression results using the ethnic fractionalization principal component index (PC1) as the dependent variable are presented in Table 6. It can be seen that precolonial jurisdictional hierarchy has a strong negative relationship with ethnic fractionalization as hypothesised. This is, the more politically centralized the precolonial institutions were, the lower the level of ethnic fractionalization. As can be seen from Column 1, the measure for precolonial jurisdictional hierarchy is negative and significant at the 1 per cent level. It can

also be seen that precolonial jurisdictional hierarchy explains over 45 per cent of the observed variation of the ethnic fractionalization principal component index. Most importantly, this relationship holds at the 1 per cent level with the inclusion of the other known determinates/correlates of ethnic fractionalization as evidenced in Column 6. However, the (absolute) coefficient falls by almost one third when the controls are included, highlighting the importance of geographic variables in their own right that also remain statistically significant with the inclusion of the other variables. It should be noted that these results are robust to the use of the individual ethnic fractionalization indices as the dependent variable, with the majority of estimations showing precolonial jurisdictional hierarchy to be highly significant (see Appendix).

In columns 2 and 3, the key variables identified by Ahlerup and Olsson (2012) and Michalopoulos (2012) are regressed against the ethnic fractionalization principal component index in isolation. Consistent with the findings of Ahlerup and Olsson (2012), their measure of uninterrupted human settlement (Oritime) is positive and highly significant.<sup>18</sup> Consistent with the findings of Michalopoulos (2012) the importance of geographic variables relating to variation of agricultural suitability is also evident. A number of controls are also shown to be significant, including absolute latitude, sea distance, and duration of colonial domination. In terms of the significance of colonial domination, these results suggest that the longer a country has been colonised the higher the degree of fractionalization. This supports the commonly held view that colonial rule exacerbated or created ethnic divisions, although ethnically divided territories may have been easier to conquer and control (Michalopoulos and Papaioannou 2011). Either way, these results suggest that duration of colonial rule is an important control for estimating measures related to ethnic fractionalization.

**<Insert Table 6>**

Perhaps the most intriguing result from these estimations is the fall in significance of Ahlerup and Olsson's (2012) Oritime measure. As can be seen from comparing Columns 2 and 4, the coefficient more than halves in value with the inclusion of the precolonial

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<sup>18</sup> The measure for this analysis is in terms of 1000s of years (rather than years). The coefficient here is approximately one third lower.

institutions in the regression. When the geographic and colonial variables are included, the value of the coefficient falls further and loses significance even at the 10 per cent level. Given that there is such a strong correlation between precolonial jurisdictional hierarchy and Origtime (0.64) this result is not completely surprising and raises the possibility that Origtime may be capturing the effect of precolonial institutions on ethnic fractionalization and/or that precolonial institutions are in large part driven by length of uninterrupted human settlement. These possibilities are explored in the case study below where Papua New Guinea is contrasted with Tonga and Samoa.

Overall, the econometric analysis confirms a fundamental relationship between precolonial jurisdictional hierarchy and ethnic fractionalization. These results are robust to a range of controls and alternative ethnic fractionalization indices. Furthermore, the measure for precolonial jurisdictional hierarchy is able to explain more variance in ethnic fractionalization than any other single measure – highlighting its inextricable, but until now undiscovered, role in explaining variations in ethnic fractionalization. However, it is acknowledged that causality has not been established. Indeed, as discussed above, it is possible, even likely, that precolonial ethnic differences shaped precolonial institutions. Another limitation of the econometric analysis is the limited sample size owing to a finite number of postcolonial states and patchy coverage of the ethnic fractionalization indices. Therefore, to gain further insight into the actual relationship between precolonial institutions and ethnic fractionalization (and its direction) and to further investigate the link between Origtime and precolonial institutions a case study of three states in the South Pacific.

### **Precolonial Institutions and Ethnic Fractionalization in the South Pacific**

The South Pacific countries of Papua New Guinea, Tonga, and Samoa were chosen for in-depth analysis three reasons. The first is that despite their proximity to one another and their many similarities, the Melanesian state of Papua New Guinea had highly decentralized precolonial institutions while the Polynesian states of Tonga and Samoa were highly centralized. Second, Papua New Guinea is often cited as the world's most ethnically fractionalized state while Tonga and Samoa are highly homogenous. Third, Papua New Guinea is recorded as having one of the longest periods of uninterrupted human settlement outside of Africa, while Tonga and Samoa were among some of the last places to be settled by humans. Therefore, it is hoped that the 'extremeness' of the contrast between these

neighbours will enable the relationship between ethnic fractionalization, precolonial institutions, and human settlement to be more readily understood and identified.

### *Introduction to Papua New Guinea, Tonga, and Samoa*

Historians suggest that human populations began to settle in New Guinea around 60,000 years ago, making their way south across partial land bridges that have long since disappeared (Matsuda 2012). These people settled across New Guinea, including the highlands regions (that were densely populated at the time of European contact) and engaged in rudimentary agriculture and animal husbandry. Much later, the Austronesian peoples are thought to have arrived, around 6000 to 5000 years ago. Originating from China's southern coast they made their way to the New Guinea mainland (mainly keeping to coastal areas) via Taiwan, the Philippines, Malaysia and Indonesia. From there, they settled in the Bismarck Archipelago around 4000 years ago. Here, they mixed with the indigenous Papuans and became known as the Lapita people, a name derived from their distinctive patterned earthenware. From the New Guinea Islands, these skilled seafarers made their way further east, colonising the previously unoccupied islands of Tonga and Samoa approximately 3000 years ago, and their descendants are the Polynesians.<sup>19</sup>

Today, Papua New Guinea is a parliamentary democracy and has an estimated population of seven million people, which is growing rapidly (World Bank 2015). Most people live a predominately 'traditional' lifestyle tending semi-subsistence gardens and it has the third highest rural population level in the world at 87 per cent (World Bank 2015). GDP per capita for 2012 is estimated to be \$2,184 per year (World Bank 2015). Its major source of foreign (and government) income is generated from natural resource exports (gold, oil, gas, copper, silver, and timber) and aid receipts. Despite recent economic growth, around 40 per cent of the population remain in poverty and education levels are broadly comparable with sub-Saharan Africa: for instance the World Bank (2015) estimates that the gross secondary school enrolment to be 40 per cent in 2012 compared to 41 per cent for the sub-Saharan Africa average. The United Nations Development Program (2013) ranked Papua New Guinea 156<sup>th</sup> of the 187 countries on the Human Development Index.

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<sup>19</sup> See Fischer 2002, Kirch 1997, Matsuda 2012 for a detailed history of the South Pacific that draws together linguistic, archaeological and genetic data. Note that these commonly cited figures are highly consistent with Ahlerup and Olsson's (2012) Origtime measure at 65,000 years for Papua New Guinea and 3,000 for Tonga and Samoa.

The Polynesian states of Tonga and Samoa are much smaller, with respective populations of approximately 105,000 and 190,000 (World Bank 2015). Tonga is a constitutional monarchy where King Tupou VI still enjoys considerable executive power while Samoa is a parliamentary democracy; however both states provide a privileged position for their paramount chiefs and aristocracy in their political institutions. Both countries' main export income is generated by agricultural exports (especially copra) and a large proportion of the population also remain in rural areas and are employed in agriculture. There are also large expatriate communities living in New Zealand, the United States, and Australia and remittances are also an important form of income. GDP per capita in 2012 for Tonga and Samoa was approximately double Papua New Guinea's at \$4494 and \$4245 respectively, as are their gross secondary school enrolment rates (World Bank 2015). In terms of the Human Development Index, Tonga is ranked 100<sup>th</sup> while Samoa is ranked 106<sup>th</sup>.

Each state had a complex, but relatively short colonial history. Following an agreement between Britain and Germany to partition the eastern half of the island of New Guinea in 1884, both powers set up colonial administrations. Britain declared the southern part a protectorate and named it British New Guinea, while Germany annexed the northern part and named it the New Guinea Islands. In 1906, the Australian Government assumed control of British New Guinea and renamed it Papua and with the outbreak of WW1 German New Guinea also fell under Australian control. Apart from a three year partial occupation by the Japanese army during the Second World War, the two territories remained under Australian control until 1975 when it gained independence. Following competing claims of ownership by Britain, Germany, and the United States of the Samoan islands, and a foreign backed civil war, (Western) Samoa was partitioned and colonised by Germany in 1900. However, following the outbreak of WW1, it fell under control of New Zealand until it gained independence in 1962. As part of the same agreement between the colonial powers that saw Samoa fall under German control, Tonga signed a Treaty of Friendship with Britain. This treaty gave Britain control over its foreign relations, but internal sovereignty was largely maintained. In 1970 Tonga gained full independence from the United Kingdom. Tongans play down their colonial experience, indeed having never been 'colonized' in the same manner as many of their Pacific neighbours is a source of national pride.

### *Precolonial Institutions*

Murdock's (1969) *Ethnographic Atlas* records 49 cultural units in what now makes up Papua New Guinea. For his measure of jurisdictional hierarchy only 3 of these cultural units are recorded as having one level of jurisdiction above the local level (e.g. petty chiefdoms) and therefore given a score of one. The remaining 46 cultural units are recorded as having none, the lowest level of jurisdictional hierarchy coded, meaning that clan or family leaders (or 'big men' chosen for their personal abilities) shared power within each village (or collection of hamlets) rather than a designated chief, and therefore given a score of zero. It is for this reason that Papua New Guinea is ranked as the most jurisdictionally decentralized country in Müller et al's (2000) dataset of postcolonial states.

This assessment is in accord with the country specific literature of Papua New Guinea. Indeed, Narokobi (1996: 28) considers that 'small self-contained communities' is the distinguishing factor of precolonial Papua New Guinea. In terms of leadership, May (2004) concludes that:

Papua New Guinean societies (and most of Melanesia generally) were characterised as 'acephalous', lacking the formal, hereditary chiefly structures which typified neighbouring Polynesia and other small-scale traditional societies in much of Africa and Asia. Leadership was seen to be localised, and normally determined by competition on the basis of skills in warfare, oratory, accumulating wealth and arranging exchanges, or in the possession of special knowledge or personal qualities. Exceptions were noted, mostly amongst Austronesian-speaking coastal societies but these were regarded as deviations from the norm.

In contrast, both Tonga and Samoa were characterised by layered hereditary chiefly structures. Each is considered a unique cultural unit by Murdock (1969) they are both recorded as having two levels of jurisdiction above the local level (i.e. paramount chiefdoms) in his *Ethnographic Atlas*. The early European explorers recorded the existence of powerful paramount chiefs and there is archaeological evidence suggesting that strong centralized power was in existence for some time well before European contact (Fischer 2002). Indeed Fischer (2002: 61) states that:

The large societies of Tonga and Hawai'i experienced absolute rulers who commanded thousands of warriors in a highly stratified and complex system held

together by ritual, taboo, and protocol. With severe punishment for infringement, these Polynesian ‘police states’ maintained social cohesion through fear and internal cohesion, leaving only a small hereditary elite, as in Europe, exempt from most injunctions and restrictions.

This suggests that Murdock’s (1969) measure for jurisdictional hierarchy may have been too conservative and should be characterised by three layers of jurisdictional hierarchy (for Tonga). Bott (1981:12) notes that ‘[a]ccording to legend and oral history, the islands have always had a centralized political structure headed by a paramount chief or king, the *Tu’i Tonga*.’ However, verification of this in a non-literate period is difficult. What is known with some certainty is that over a number of decades, and series of battles with other paramount chiefs, George Tupou became the undisputed leader of Tonga in 1851 (His Majesty King George Tupou I) and established a dynasty that still rules today. While this consolidation of power occurred before the Treaty of Friendship with Britain, it was well after the arrival (and influence) of the European colonial powers. Indeed King George, a baptised Christian, took his name from the line of monarchs that ruled England from 1714 to 1830 and this highlights the difficulties in categorising precolonial institutions. In summary, however, there seems little doubt that the precolonial institutions of Papua New Guinea were highly decentralized while in the Polynesian states of Tonga and Samoa they were highly centralized.

### *Ethnic Fractionalization*

Fearon (2003:205) gave Papua New Guinea a value of 1 for his ethnic fractionalization index and described it as approximating ‘a perfectly fractionalized state’. Ahlerup and Olsson (2012:87) described Papua New Guinea as having ‘extreme ethnic diversity’. This view is echoed by a number of Papua New Guinea country specialists. Levine (1997: 479) suggests that ‘if ethnic communities are understood to be groups possessing a distinctive language, custom and memories – traits that give members a sense of unity and cause them to distinguish themselves (and be distinguished from others) – then PNG may have more than one thousand such ethnic groups within its borders’. Reinforcing this, Reilly (2008:14) concludes that even if conservative figures are used in measuring ethnolinguistic groups (e.g. tribes – aligned or related clan groupings), the degree of fractionalization in Papua New Guinea ‘makes diverse societies elsewhere look relatively homogeneous by comparison’. However, some of the compilers of other ethnic fractionalization indices have produced much

lower measures, calling into question Papua New Guinea's status as the world's most ethnic fractionalized state.<sup>20</sup>

There seems little doubt that Papua New Guinea is the world's most *linguistically* diverse country. In terms of Lewis et al's (2014) linguistic fractionalization index, Papua New Guinea is the most linguistically fractionalized of the 232 states for which data are recorded. Lewis et al's (2014) *Ethnologue* data records 838 living languages, which is approximately 10 per cent of the world's total. These languages belong to two different language groups: Austronesian (which includes approximately 200 Melanesian languages) and Non-Austronesian (which includes approximately 600 Papuan languages). Despite coming from two only broad language groups, the 800 plus living languages are categorised as *languages*, not dialects. In making the distinction, which they acknowledge requires some degree of judgement, Lewis et al use ISO language identification criteria that includes both linguistic and ethnolinguistic *identity* criteria.

While Papua New Guinea is the world's most *linguistically* fractionalized country, this does not necessarily mean it is the most *ethnically* fractionalized. Language is not always a good measure for ethnicity, especially in the Americas where different ethnic groups often share a common language. However, in Papua New Guinea (and in much of Melanesia) the key ethnic marker is almost certainly language. Nanau (2011:34) considers that '[t]he principal point of reference and identification by Melanesians would be in relation to the language spoken'. Indeed, in Papua New Guinea, group loyalty is quite literally defined in terms of language, and labelled the *wantok* system. *Wantok* is a Melanesian *Pisin* term meaning 'one talk' (or the same language speakers). The language they refer to is one's local language (mother tongue), while *Pisin* and *Motu* (and sometimes English) are mostly spoken when conversing in mixed groups. The importance of the *wantok* system to Papua New Guinean social life cannot be overstated and is discussed in greater detail below. It requires one's loyalties to be directed toward one's kin and language group over other potential loyalties.

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<sup>20</sup> At the other end Alesina et al (2003) calculated a value of 0.27. In ascribing this value Alesina et al (2003). They relied on 'Papuan', 'Melanesian', and 'Other' distinctions sourced from the Encyclopaedia Britannica. The compilers of the ANM (the source for Taylor and Hudson 1972) made an exception to their normal practice by coding Papua New Guinea by 'racial' categories rather than by language group which led to them to produce a much lower fractionalization measure (0.42). Montalvo & Reynal-Querol (2005) produced a figure of 0.35 while La Porta et al (1999) produced a figure of 0.80.

In contrast to Papua New Guinea, Tonga and Samoa are ‘among the most ethnically homogeneous societies in the world today, being composed of one dominant cultural group and usually speaking one language’ (Reilly 2004:480). This is confirmed by the ethnic fractionalization indices that include these Polynesian states: Taylor and Hudson (1972) produced an extremely low figure of 0.017 for Samoa, Alesina et al (2003) also produced a figure of 0.0869 Tonga, while Montalvo & Reynal- Querol (2005) produced a figure of 0.199 for Samoa and 0.034 for Tonga.<sup>21</sup> This is also borne out in both countries’ folklore and mythology. For instance, according to Samoan mythology, all Samoans share a common ancestor named *Tagaloa* (Tuvale 2006). While it is true that Tonga and Samoa are much smaller than Papua New Guinea, the average size of Papua New Guinean language (ethnic) group is still much smaller and on average well under 10,000 people. Furthermore, Oliver (1973) found that some communities as small as 200 to 300 people have their own conception (and myths) of common origin. In summary, ‘Melanesia is characterized foremost by its enormous ethnic, social and cultural diversity’ while ‘Polynesian society was [and is] characterized foremost by its remarkable, ethnic, linguistic and cultural homogeneity’ (Fischer 2002:24-32).

## **Discussion**

The relationship between precolonial institutions and ethnic fractionalization has been firmly established. The econometric analysis has shown that precolonial jurisdictional hierarchy has a highly significant statistical relationship with ethnic fractionalization. The South Pacific case studies have also confirmed this relationship: precolonial Papua New Guinean societies had perhaps the most decentralized precolonial political institutions of anywhere in the world and Papua New Guinea is now widely considered to be the most ethnically fractionalized country in existence; conversely the Polynesian states of Tonga and Samoa had highly centralized precolonial institutions and they are highly homogenous. What has not yet been established is the direction of this relationship, however there are some who suggest precolonial jurisdictions play an important role in current levels of fragmentation. Nanau (2011:35) suggests that the level of ethnic diversity found in Melanesia is ‘testament to the

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<sup>21</sup> Not all of the ethnic fractionalization indices have a value for Tonga or Samoa, including those produced by Fearon (2003) and La Porta et al (1999), presumably given their relatively small populations, approximately of 100,000 for Tonga and 200,000 for Samoa.

fragmentation and relatively small size of Melanesian societies in pre-contact era'; while Reilly (2001:170) – partially quoting Hegarty (1979) - reaches a similar conclusion: 'With no common history of statehood, its people are fragmented into hundreds of often mutually antipathetic ethnic groupings'.<sup>22</sup> Therefore, it is hoped that by further exploring the link between precolonial institutions and ethnic identity, and importantly how this has mutated in Papua New Guinea, some inference can be made in relation to the causal nature of the relationship. Furthermore, by building on the analysis of Ahlerup and Olsson (2012) and considering the spread of human settlement across the Pacific, it is hoped that an explanation for such a strong link between length of human settlement and precolonial institutions can also be made.

### *The Wantok System of Papua New Guinea*

The continued existence of precolonial institutions and how they have maintained precolonial notions of ethnicity *and* led to new forms of ethnic groupings is outlined by detailing the *wantok* system in Papua New Guinea. As mentioned earlier, the *wantok* system is central to Papua New Guinean society. It is directly related to precolonial custom, in particular obligations toward one's own kin and ethnic group, and closely tied to the customary notion of reciprocity. Indeed, in a stateless society, obligations and privileges associated with kinship, would seem essential for survival.

The *wantok* system produces numerous benefits for Papua New Guineans, a country where the state is notoriously weak both in terms of capacity and reach. The benefits include the only form of insurance for many (including income, health, housing and personal security shocks). However, it also affects the capacity of almost every part of the Papua New Guinean state to function as it was intended, and it has since its very beginning. The earliest colonial reports expressed frustration with the lack of impartiality shown by state appointed village officials in carrying out their state duties (see Report on New Guinea 1900–1: 74, c.f. Rowley 1958: 224 and Lawrence 1969). However, in precolonial Papua New Guinea, showing preference to one's extended kinship network was expected, indeed it was a requirement under precolonial custom. Power was widely dispersed, even at the village level, and the effects of partiality were offset through collective decision making and mediation among different clans and groupings of broadly equivalent size.

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<sup>22</sup> Papua New Guinea is a mountainous country, with large plateaus and deep valleys, and with a significant population living on surrounding islands.

For state officials today, when there is a choice to be made between complying with state or *wantok* obligations, the latter is often given priority. This can jeopardise the most basic functions of government, including the provision of basic goods, services, and infrastructure; the allocation of budgetary funds; and administration of justice. In addition to rent seeking politics on a grand scale (see Reilly 2008), the *wantok* system also impacts on the day to day dealings of all public officials and their ability to do their job as an impartial agent of the state. In a study of the country's largest jail, Reed (2003: 165) has documented how *wantokism* requires warders to favour their own and provides this account on its pervasiveness:

A convict from Kerema once explained to me how he sent letters without them being censored. After writing his message, he handed the note to a language mate [wantok] on guard duty, who smuggled it out of Bomana and then took a bus to town. There the warder entered a post office and passed the letter to a language mate who worked behind the counter. This clerk stamped the envelope, without charge, and placed it into a sack post-marked for Kerema town.

While *wantokism* undoubtedly corrupts state institutions and severely weakens the potency of the state, it would be a mischaracterisation to describe it simply as 'corruption'. While there is plenty of 'traditional corruption' in Papua New Guinea (the exercise of public office for private gain), *wantokism* is a different phenomenon. Often those who exercise public power inappropriately out of customary obligations do not gain personally, any more than someone complying with state obligations benefits personally from paying taxes or performing jury duty. State officials who fail to use their public office to assist their *wantok* group when they are called upon to do so can face ostracism and other non-state sanctions (Larcom 2015).

Most importantly for this analysis, the *wantok* system, which is a direct descendant of Papua New Guinea's precolonial institutions, relies on notions of *ethnicity* for it to function. Indeed, it requires preferential treatment for one's ethnic group. That is, in order to qualify for special treatment, one must have an ethnic group. Furthermore, the effects of *wantokism*, both good and bad, are directly related to the size of the group and therefore degree of ethnic fractionalization. Indeed, it would be perfectly redundant in both a perfectly homogenous population (because every individual would require special treatment) and in a perfectly fractionalized population (because every individual would be their own ethnic group). However, given the decentralized nature of Papua New Guinea's precolonial institutions and

the intensity of the obligations (that will often see one group member literally put their life on the line for another member) each group must have been (and be) sufficiently small.<sup>23</sup> This is so, as without centralized authority close personal and kinship relations are necessary to enforce reciprocal obligations and guard against rampant free riding within the group. Indeed, there is evidence showing how free riding can be avoided in sufficiently small groups in the absence of centrally enforced sanctions (Claxton 2000).

For Papua New Guinea's precolonial institutions to function effectively they required sufficiently small *wantok* groupings and we know that in precolonial times they were indeed small. For the system to continue to function now, broadly along the same lines as it did, it continues to require a multitude of ethnic groups, which is indeed the case. For direct evidence of precolonial institutions affecting notions of ethnicity and ethnic fractionalization, evidence is required of *wantok* groups mutating to enable precolonial institutions to function in new circumstances, and this can be found. *Wantokism* is no longer confined to kinship or language groups and can be evoked in relation to introduced markers, perhaps the most prominent being province (Papua New Guinea has 20 provinces plus the Autonomous Region of Bougainville and the National Capital District). Importantly, with increased mobility among its citizens *wantokism* usually involves a number of levels, ranging from one's kinship group (where the primary obligation lies and intensity of obligation is strongest) to broad language group, to Province, and even region and Christian denomination. Nanau (2011:35) points out that the term can be used at 'many levels and it has different meanings from these vantage points'. For instance, at the local village level a *wantok* would refer to direct kinship ties, whereas in urbanised environments, with a cross section of ethnic groups, it could refer to broad language groups or even home province (a colonial construct). Indeed, Trompf (1994) notes that urban environments where residents often lack of sufficient numbers of close kinsmen, people who speak the same broad language group or come from the same province may support one another, even if they are traditional enemies back home. Indeed, Trompf (1994) labels these developments in urban environments of Papua New Guinea as *neo-tribalism*. This is in sharp contrast with Tonga and Samoa. While kinship obligations also continue to play an important role in everyday life, they do not come at the expense of a commonly shared national identity or national institutions. Indeed, both postcolonial states are built around their precolonial institutions who reinforce notions of

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<sup>23</sup> See Larcom (2015) who outlines the group obligations attached to *wantokism* in the enforcement of customary sanctions and strong notions of group liability that still exist in Papua New Guinea.

ethnic homogeneity (Reilly 2004). Therefore, the precolonial institutions do not require new forms of ethnicity to be established for them to function in new circumstances, such as urban environments.

### *Precolonial Institutions and Length of Human Settlement*

As discussed above, Ahlerup and Olsson (2012) suggest that random cultural drift among populations accumulates and causes the formation of new ethnic groups. They provide a model of collective good provision where the productivity of group members falls with respect to geographic and cultural distance. Allowing for discontinuities, they show that at some point there are net gains from some members breaking away from the original group and forming their own. They also use the case of Papua New Guinea to support their results, noting both its ethnic diversity and that it has one of the longest periods of uninterrupted human settlement outside Africa. It is also noteworthy that their model is consistent with the cases of Tonga and Samoa; both have a relatively short period of human settlement (approximately 3000 years) and are highly homogeneous. However, it has been shown here that as well as being highly fractionalized Papua New Guinea also had highly decentralized precolonial institutions, while both Tonga and Samoa are highly ethnically homogenous and had highly centralized precolonial institutions. It was also found that the Origtime variable is highly correlated with precolonial institutions and that once precolonial institutions are included (along with geographic variables) it loses its significance in explaining current variations in ethnic fractionalization. This result underscores fundamental theoretical and empirical relationship between precolonial institutions and ethnic fractionalization. However, it could also see a reinterpretation of Ahlerup and Olsson's (2012) model and results, where length of uninterrupted human settlement partly drives decentralized institutions. While there are numerous mechanisms that could drive this result, centralized monitoring and control costs are likely to also increase with cultural drift. By taking account institutions, an explanation for homogeneity in the first place is provided. Centralized institutions are likely to be required for the colonisation of new lands, whether it be for generating military strength to conquer the indigenous population or the many logistical hurdles in settling previously uninhabited lands. This is indeed the view of Fischer (2002: 18) in relation to the settlement of Tonga and Samoa; these 'settler societies of Remote Oceania had to be strongly hierarchical in their structure; only a strong hierarchy of command ensured survival in settlement events, maintaining social order while safeguarding food production.' While it is acknowledged that this channel is speculative, it highlights the fundamental

necessity of accounting for institutions when aiming to account for variations in ethnic fractionalization and would seem to indicate a rich vein of future research.

## CONCLUSION

This article has added a large piece of the puzzle in terms of uncovering the drivers of ethnic fractionalization. Precolonial institutions explain almost half the variation in ethnic fractionalization for a sample of postcolonial countries. While this result is new to the literature, it should not be so surprising given that both the ethnic fractionalization and precolonial institutions literatures highlight the importance of tribalism in linking their measures to economic development. While geographic variables remain highly significant with the inclusion of precolonial institutions, length of human settlement does not. This suggests that this measure may be in large part capturing precolonial institutions, once again highlighting the inextricable link between precolonial institutions and ethnic fractionalization. By considering the case of Papua New Guinea (which had highly decentralized precolonial institutions and is highly ethnic fractionalized) with its South Pacific neighbours Tonga and Samoa (which had highly centralized precolonial institutions and are highly ethnically homogenous) the relationship between these two measures can be better understood and some insight into the causal relationship is made. There is evidence of precolonial institutions maintaining and shaping notions of ethnicity in all three countries.

These findings are important for policy makers for two reasons. First, they indicate that as well as geographic factors, *institutions* help shape notions of ethnicity and therefore the degree of ethnic fractionalization in a country. This suggests that despite the numerous failed attempts of the 20<sup>th</sup> century (e.g. Yugoslavia, Iraq, Czechoslovakia, etc), nation building among different groups may not always be in vain, especially if a (very) long term perspective is taken. Second, uncovering the relationship between precolonial institutions and ethnic fractionalization helps shed light on the well-known relationship between ethnic fractionalization and economic development. Specifically it provides an alternative transmission channel linking ethnic fractionalization and economic development – *precolonial institutions*. It also suggests that previous cross country ethnic fractionalization studies were, at least in part, picking up the effects of precolonial institutions and the phenomenon of legal pluralism. It is hoped that this article will go some way unifying the precolonial institutions and ethnic fractionalization literatures, which so far have somehow remained separate.

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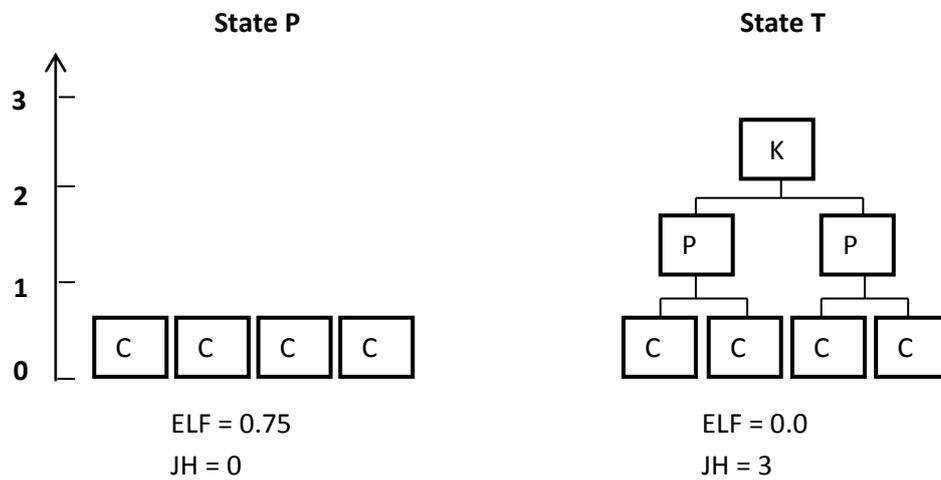
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## TABLES AND FIGURES

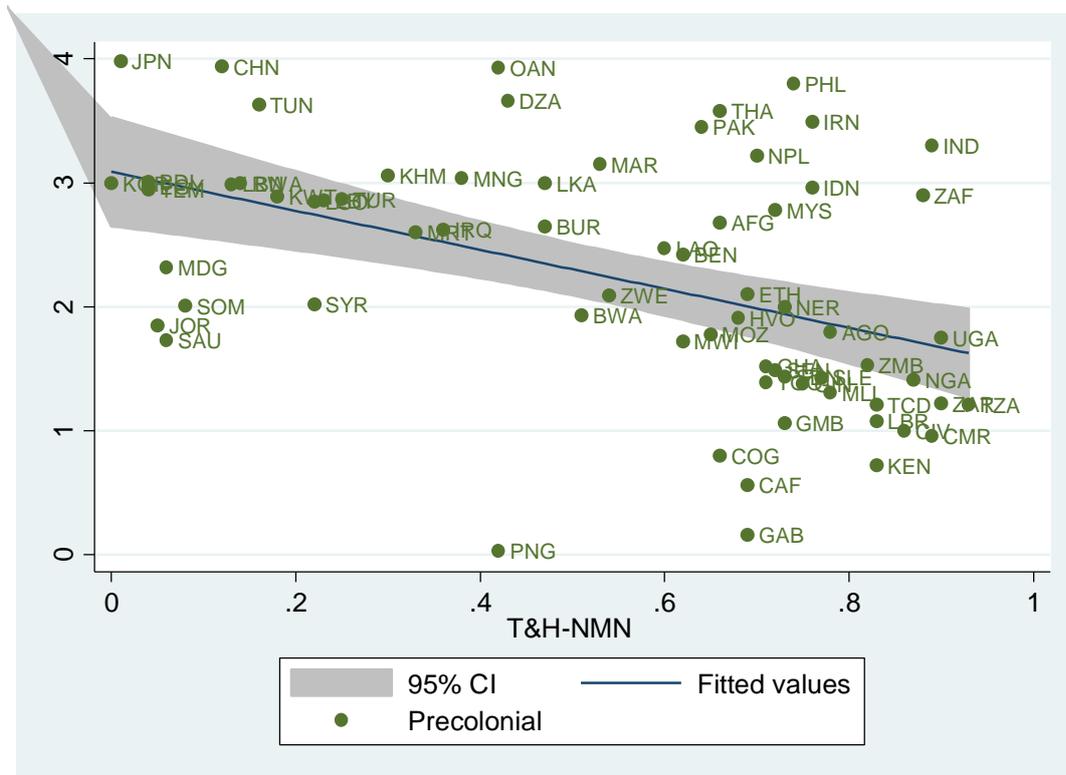
**Figure 1: Precolonial Jurisdictional Hierarchy and Ethnic Fractionalization**



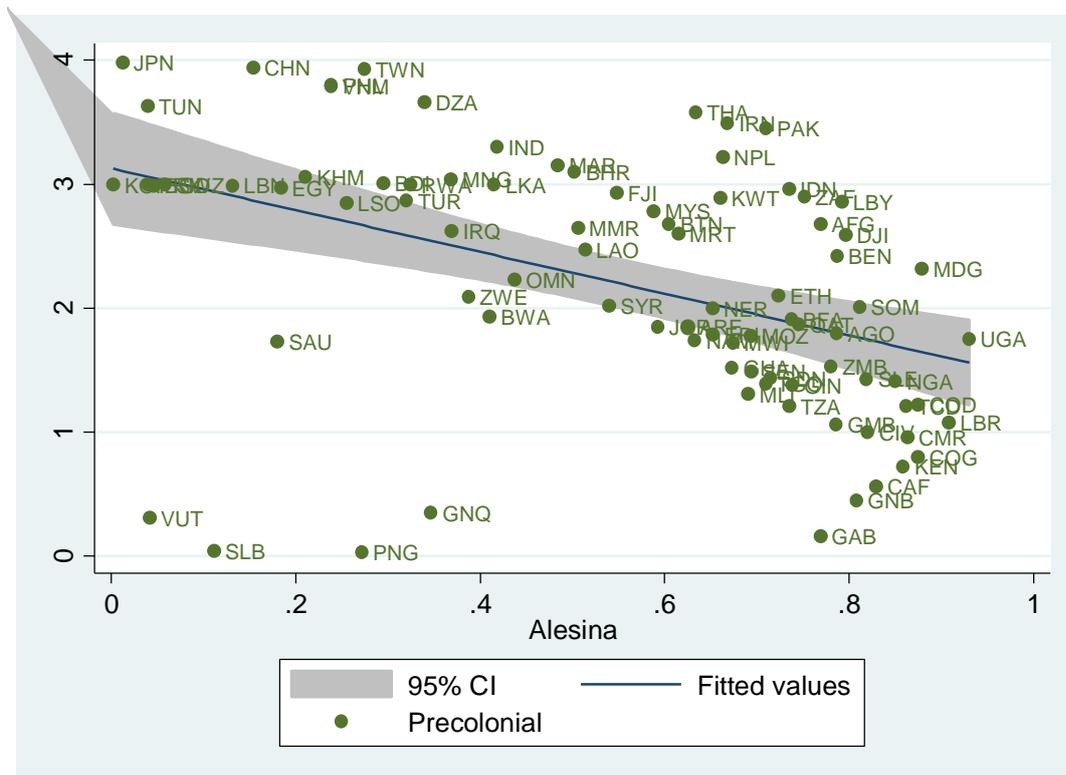
**Table 1: Correlation Coefficients of Ethnic Fractionalization Indices**

	T & H	La Porta	Alesina	Fearon	M & R-Q	Precolonial
T & H	1					
La Porta	0.935	1				
Alesina	0.693	0.666	1			
Fearon	0.694	0.741	0.872	1		
M & R-Q	0.872	0.883	0.693	0.676	1	
Precolonial	-0.476	-0.627	-0.654	-0.752	-0.541	1

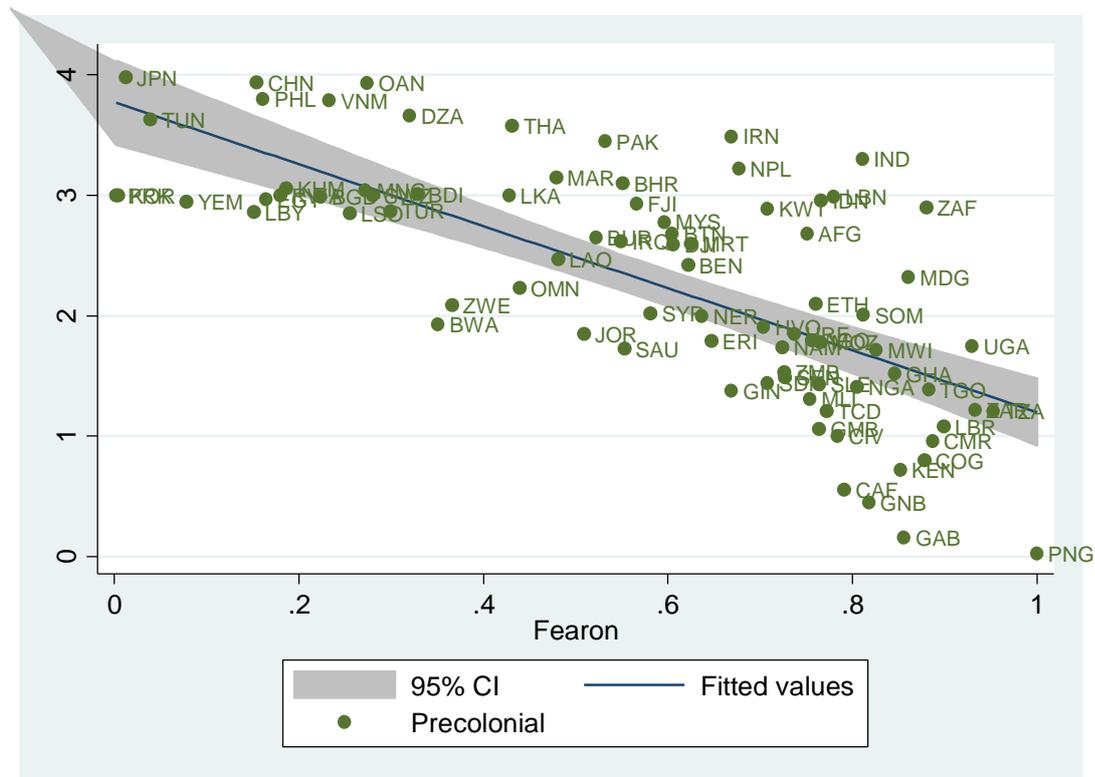
**Figure 2: Precolonial Institutions and Taylor & Hudson's (1972) Ethnic Fractionalization Measures**



**Figure 3: Precolonial Institutions and Alesina et al (2003) Ethnic Fractionalization Measures**



**Figure 4: Precolonial Institutions and Fearon’s (2003) Ethnic Fractionalization Measures**



**Table 2: Eigenvalues of reduced correlation matrix**

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	4.09346	3.5208	0.8187	0.8187
Comp2	.572656	.402567	0.1145	0.9332
Comp3	.170088	.050231	0.0340	0.9672
Comp4	.119857	.0759181	0.0240	0.9912
Comp5	.0439394	.	0.0088	1.0000

**Table 3. Eigenvectors**

Index	Factor 1
T & H	0.4600
La Porta	0.4635
Alesina	0.4262
Fearon	0.4331
M & R-Q	0.4520

**Table 4: Data Definitions and Sources**

<b>Variable</b>	<b>Description</b>	<b>Source</b>
T & H	Taylor and Hudson's (1972) original ethnolinguistic fractionalization index sourced from the Atlas Narodov Mira (ANM).	Roeder (2001)
La Porta	A composite index aiming to capture fractionalization mainly based on language.	La Porta et al (1999)
Alesina	Alesina et al's (2003) ethnic fractionalization index that emphasises 'racial' characteristics	Alesina et al (2003)
Fearon	Fearon's (2003) ethnic fractionalization index that emphasises the salient ethnic marker at the country level	Fearon (2003)
M & R-Q	Montalvo and Reynal-Querol (2005) ethnic fractionalization index using a lower level of disaggregation	Montalvo and Reynal-Querol (2005)
Ethnic FPC	The first (principal) component generated from the five indices above.	Larcom (2015)
Precolonial	A country level weighted index of precolonial jurisdictional hierarchy sourced from Murdock's (1969) Ethnographic Atlas	Müller et al (2000)
Origtime	Duration of human settlement (thousands of years)	Ahlerup and Olsson (2012)
Latitude (abs_latclip)	Absolute latitude of country	Michalopoulos (2012)
Elevation (emeanclip)	Average elevation across regions of country	Michalopoulos (2012)
Variation in Elevation (sd_emeanclip)	St. dev of elevation across regions of country	Michalopoulos (2012)
Climatic Suitability (Climclip)	Average agricultural suitability across regions of country based on climatic properties	Michalopoulos (2012)
Variation in Climatic Suitability (sdclimclip)	St. dev of agricultural suitability across regions of country based on climatic properties	Michalopoulos (2012)
Precipitation (precavclip)	Average monthly precipitation of country from 1961-1990 in 1000's of mm	Michalopoulos (2012)
Sea Distance	Distance from Coast of Country	Michalopoulos (2012)
Colonial Duration	Total years colonised	Ziltener and Kuenzler (2013)

**Table 4. Correlation Coefficients.**

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Ethnic FPC	1											
2. Precolonial	-0.663	1										
3. Origtime	0.580	-0.639	1									
4. Latitude	-0.628	0.606	-0.621	1								
5. Elevation	-0.132	0.244	0.00400	0.229	1							
6. Var. Elevation	-0.0240	0.362	-0.346	0.386	0.653	1						
7. Climate	0.234	-0.224	0.151	-0.483	-0.0373	-0.146	1					
8. Var. Climate	-0.0412	0.227	-0.160	0.505	0.312	0.524	-0.562	1				
9. Precipitation	0.233	-0.185	-0.0462	-0.504	-0.245	-0.109	0.782	-0.580	1			
10. Sea Distance	0.195	-0.0914	0.326	-0.0792	0.559	0.268	-0.241	0.297	-0.386	1		
11. Africa	0.350	-0.496	0.727	-0.425	-0.115	-0.476	-0.0779	-0.0689	-0.284	0.242	1	
12. Colonial	0.218	0.132	-0.0343	-0.189	-0.191	-0.0336	0.249	-0.178	0.366	-0.373	-0.158	1

**Table 5. Summary Statistics.**

	mean	sd	min	Max
T & H	.5689474	.2858114	0	.93
La Porta	.5373377	.2981539	0	.890247
Alesina	.6043158	.2500767	.002	.9302
Fearon	.6218421	.2683743	.004	1
M & R-Q	.5955041	.2657084	.013902	.958587
Ethnic FPC	.0378263	2.020417	-4.723228	2.658493
Precolonial	2.134737	.9999841	.03	3.98
Oritime	102.1281	45.26974	1.3	160
Latitude	16.08759	11.38976	.6351351	38.95833
Elevation	.652267	.4766037	.03325	2.064103
Var. Elevation	.3517665	.3668594	.0130357	1.906438
Climate	.7161923	.3369615	.0161884	.9999425
Var. Climate	.1505363	.1493469	.0000228	.456115
Precipitation	93.15781	62.73833	4.003088	265.2609
Sea Distance	.4266809	.3398175	.0132175	1.144063
Africa	.7017544	.4615545	0	1
Colonial	130.8947	108.833	15	469

**Table 6. Drivers of Ethnic Fractionalization**

	(1)	(2)	(3)	(4)	(5)	(6)
Precolonial	-1.334 <sup>***</sup> (0.208)			-1.003 <sup>***</sup> (0.276)	-1.049 <sup>***</sup> (0.274)	-0.939 <sup>***</sup> (0.290)
Origtime		0.0262 <sup>***</sup> (0.00499)		0.0117 <sup>*</sup> (0.00665)		0.00828 (0.00595)
Latitude			-0.101 <sup>***</sup> (0.0329)		-0.0557 <sup>*</sup> (0.0301)	-0.0452 (0.0321)
Elevation			-1.914 <sup>**</sup> (0.862)		-1.530 <sup>**</sup> (0.581)	-1.648 <sup>***</sup> (0.608)
Var. Elevation			2.641 <sup>**</sup> (1.118)		2.598 <sup>***</sup> (0.772)	2.685 <sup>***</sup> (0.827)
Climate			1.146 (0.799)		0.908 (0.817)	0.749 (0.782)
Var. Climate			2.655 (1.722)		1.737 (1.370)	1.663 (1.263)
Precipitation			-0.00132 (0.00553)		-0.00260 (0.00582)	-0.00123 (0.00547)
Sea Distance			1.468 <sup>*</sup> (0.788)		1.466 <sup>**</sup> (0.649)	1.347 <sup>**</sup> (0.667)
Africa			1.182 (0.745)		0.561 (0.529)	0.265 (0.493)
Colonial			0.00330 <sup>**</sup> (0.00141)		0.00559 <sup>***</sup> (0.00166)	0.00517 <sup>***</sup> (0.00155)
Constant	2.889 <sup>***</sup> (0.425)	-2.665 <sup>***</sup> (0.576)	-1.005 (1.733)	0.981 (1.167)	0.837 (1.323)	-0.0552 (1.627)
Observations	58	58	57	58	57	57
R <sup>2</sup>	0.451	0.340	0.614	0.491	0.748	0.757

Robust standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## APPENDIX

Table A1. Regression with Individual Ethnic Fractionalization Indices

	(1)	(2)	(3)	(4)	(5)	(6)
	Ethnic FPC	T & H	La Porta	Alesina	Fearon	M & R-Q
Precolonial	-0.939*** (0.290)	-0.0680 (0.0473)	-0.138*** (0.0331)	-0.106** (0.0411)	-0.188*** (0.0232)	-0.0760* (0.0404)
Oritime	0.00828 (0.00595)	0.00197 (0.00129)	0.00156 (0.00116)	-0.000501 (0.00140)	0.0000334 (0.00126)	0.00156 (0.00122)
Latitude	-0.0452 (0.0321)	-0.00106 (0.00512)	-0.00332 (0.00486)	-0.0113*** (0.00385)	- 0.00933*** (0.00336)	-0.00897** (0.00430)
Elevation	-1.648*** (0.608)	-0.238** (0.106)	-0.218** (0.0867)	-0.0773 (0.0838)	-0.0890 (0.0708)	-0.217** (0.0923)
Var. Elevation	2.685*** (0.827)	0.250 (0.175)	0.329** (0.130)	0.199 (0.124)	0.294*** (0.104)	0.286** (0.127)
Climate	0.749 (0.782)	0.134 (0.124)	0.0447 (0.130)	-0.0141 (0.124)	-0.0171 (0.0915)	0.137 (0.125)
Var. Climate	1.663 (1.263)	0.407** (0.191)	0.208 (0.218)	0.129 (0.217)	0.107 (0.181)	0.403* (0.215)
Precipitation	-0.00123 (0.00547)	0.000524 (0.000759)	0.000290 (0.000768)	-0.00120 (0.000964)	-0.000794 (0.000552)	-0.000661 (0.000939)
Sea Distance	0.265 (0.493)	-0.0149 (0.0834)	0.0510 (0.0787)	0.0591 (0.107)	-0.0298 (0.0918)	-0.0665 (0.0897)
Africa	1.347** (0.667)	0.320*** (0.106)	0.216** (0.102)	0.0929 (0.0729)	0.0208 (0.0641)	0.235** (0.0886)
Colonial	0.00517*** (0.00155)	0.000882*** (0.000277)	0.000993*** (0.000256)	0.000360* (0.000190)	0.000416* (0.000209)	0.000760*** (0.000224)
Constant	-0.0552 (1.627)	0.159 (0.241)	0.389 (0.250)	1.011*** (0.239)	1.147*** (0.179)	0.529** (0.209)
Observations	57	66	69	76	75	66
R <sup>2</sup>	0.757	0.606	0.699	0.522	0.705	0.642

Robust standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$