Impact of Socioeconomic Globalization and Institutional Quality on Human Capital Development in Nepal: A Markov Regime Switching Analysis

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Abstract

Human capital development is a catalyst for the economic growth of a nation. This study employed the Markov regime-switching model to examine the impact of socioeconomic globalization and institutional quality on human capital development in Nepal, using data from 1980 to 2018. The findings revealed that social globalization promotes human capital development in Nepal, whereas institutional quality impedes it. Additionally, economic globalization either negatively impacted or did not significantly contribute to human capital development in both regimes. Financial development was found to severely hamper human capital development, while inflation had a positive effect in both regimes. The results offer insights that the quality of institutions within the globalized context of Nepal is crucial for enhancing human capital development. This improvement could stimulate private-sector financing and alleviate the crowding-out effects of government spending and policy shifts. Consequently, the policy implication of this research is that Nepal should prioritize enhancing institutional quality and fostering social globalization while addressing the adverse effects of economic globalization and financial development to bolster human capital development.

***Keywords*:** globalization, human capital, policy score, transition probabilities, Markov switching, Nepal

***JEL classification*:** C24, E31, F6, J21, J24, O15, O47

Introduction

Economic development embodies the multifaceted ingredients, primarily from integrating physical and human capital, labor force, division and specialization of jobs, learning by doing, research and development, technological sophistication, and institutions (Arrow, 1962; Barro & Sala-i-Martin, 2004; Domar, 1946; Harrod, 1939; Kaldor, 1963; Ramsey, 1982; Romer, 1986; Todaro & Smith, 2012; Schumpeter, 1934; Smith, 1776/1937; Solow, 1956). From an early age to the present, policymakers and academics have great attention to human capital in dealing with the country's economic development. Todaro and Smith (2012) state that human capital is the productive investment in health and education that is embodied in skills, location, and health aspects of the human persons. Health and education are two catalysts of human capital development. Many studies revealed that education spending, level of schooling, skills, labor force quality, health spending, and health facilities had significantly

enhanced economic development (Dangal & Gajurel, 2019; Dangal & Gajurel, 2022; Gajurel, 2023; Krueger & Lindahl, 2001; Lee & Kim, 2009; Mincer, 1984; Pelinescu, 2015; Tsai et al., 2010). Thus, human capital is a crucial dimension of the economic development of the nation.

Globalization integrates the national economies with the economies of the rest of the world through the free flow of goods and services, ideas, labor, and capital (Franco-Bedoya, 2023; International Monetary Fund [IMF], 2002; Todaro & Smith, 2012). Socio-economic globalization may, therefore, help to transfer skills, knowledge, health care, traditions, values and norms, ideas, capital, and technology that should play a pivotal role in enhancing human capabilities. Held (2004) assumed that due to globalization, economies, politics, and cultures were being integrated and merged across the globe as the free flow of information, knowledge, ideas, and global corporations. In line with this, some studies revealed that human capital development was promoted in the aftermath of globalization in the economy (Hickman & Olney, 2011; Nauriyal et al., 2009; Olagunju et al., 2019). Socio-economic globalization thus enhances human mobility, skills and knowledge drain across the broader, and human investment via health and education; thereby it can promote human capital formation in the economy.

Socioeconomic environments, as well as official and informal rules, have a significant impact on economic activity. Institutions are human-created limitations that govern political, economic, and social relationships. They include both informal restraints like punishments, taboos, customs, traditions, and codes of conduct, as well as formal regulations like constitutions, laws, and property rights (North, 1991). Acquah et al. (2023) emphasized that institutions influence agent interactions both formally through the rule of the game and informally by shaping customs and norms, stimulating the ability of individuals and organizations to guide society toward productive economic activities. Kaufmann et al. (1999) identified six institutional quality indicators: corruption control, political stability and absence of violence and terrorism, regulatory quality, rule of law, voice and accountability, and government effectiveness. Many studies concluded that the institutional quality of the nation could enhance its economic development (Acquah et al., 2023; Ahmed et al., 2022; Para & Datta, 2023). Moreover, a study by Ouedraogo et al. (2022) revealed that institutional quality helped human capital development by channeling education and health.

Since 1951, Nepal's economy has transitioned from a ruler-centric model with limited trade to a mixed economy, and since 1990, to a liberal, open market economy under donor pressure to globalize, yet despite adopting neo-classical economic practices, poverty has rapidly escalated over the past decade (Bhattarai, 2001). With globalization in Nepal, demographic dividend pursues foreign employment for their better human capabilities, experiencing the improved human capital index (HCI) and human development index (HDI) in Nepal (Ministry of Finance [MOF], 2023; World Bank, 2020). On the other hand, the institutional quality of Nepal observed that violence rates are down, but governance progress has stagnated despite increasing female representation, some improvement in addressing gender violence, and a rising corruption index indicating the need for stronger governance efforts in Nepal (MOF, 2023). Human capital development may be enhanced with globalization but may be hindered by undesirable institutional quality indexes.

Socio-economic integration across the globe helps the transformation of skills, knowledge, capital, and technology that ultimately promote the nations' human capital development. If institutional qualities are satisfactory in the country, global ideas, skills, competencies, capital, and technology should be pivotal for human capital development. The previous studies were unidirectional and focused on either globalization and human capital development (Bahadur, 2011; Dizon et al., 2021; Olagunju et al., 2019; Simplice, 2013; Solarin & Eric, 2015) or institutional quality and human capital (Fomba et al., 2023; Ouedraogo et al., 2022). This study is, therefore, an attempt to examine the impact of socioeconomic globalization and the institutional quality on human capital of development in Nepal.

Globalization enhances the socioeconomic interaction of the citizens of Nepal. It increases foreign employment and education, expecting higher skills and knowledge attainment and better health and educational outcomes in Nepal. On the flip side, institutional quality dimensions that we are experiencing less pleasing in Nepal may hinder human capital development in terms of education and health outcomes. This study, therefore, attempts, with empirical investigation, to answer the question: Does socioeconomic globalization and institutional quality matter for the human capital development of Nepal?

The study is thus intended to examine the impact of socioeconomic globalization and institutional quality on the human capital development of Nepal. The findings of the study may be relevant for optimizing human capital development plans in the globalized world with institutional quality constraints in Nepal. To our knowledge, the study, which was unacquainted properly, also fills the literature gaps in the comprehensive study of globalization and institutional quality for human capital development in Nepal. The rest of the paper is divided into five sections: literature review, data and methods, results and discussion, conclusion and implication, and limitations and scope for future research.

Review of Previous Studies

Globalization and Human Capital Development

Many studies focused on the impact of globalization on economic growth (Afzal, 2007; Ahmad, 2019; Huh & Park, 2021; Ponzio, 2005; Wani & Mir, 2021) and found globalization promoted economic growth. Globalization is more effective with a high level of education; thus, it was a crucial phenomenon that benefited developed countries rather than less developed countries (Stewart, 1996). Anwar et al. (2016) and Mazlan et al. (2019) demonstrated a significant short- and long-run positive impact of globalization on human capital development in the Malaysian and Pakistani economies, respectively. Conversely, evidence from the Nigerian economy, economic globalization negatively impacted human capital development in the long run, which may be a consequence of higher workers drain abroad from the economy (Solarin & Eric, 2015).

A study found that globalization caused human capital, indicating global economic integration may promote education attainment (Zaidi et al., 2019). Considering 110 developing economies from the year 1970 to 2015, Olagunju et al. (2019) reported that globalization may bridge the poverty gap and reduce child mortality, thereby promoting welfare outcomes from human capital in developing economies. Additionally, the study also suggested that globalization played a crucial role in fostering human capital in the tourism sector (Becherel & Cooper, 2002). Evidencing from Africa, Simplice (2013) revealed that globalization improves

human development. Many reviewed studies show that globalization enhances human capital development. The study thus, postulates the hypothesis as

H_1: Economic globalization positively affects human capital development.

H_2: Social globalization positively affects human capital development.

Institutional Quality and Human Capital Development

Several studies revealed that institutional quality is the precondition for economic growth and development (Ahmed et al., 2022; Barro, 1997; Butkiewicz & Yanikkaya, 2006; Hayat, 2019; Nawaz et al., 2014; Nguyen et al., 2018; Olson, 1982). Institutions catalyze economic complexity by maneuvering human resources for productivity and innovative entrepreneurship (Vu, 2022), accelerating economic growth (Romer, 1990).

A recent study by Githaiga and Kilong'i (2023), considering 34 sub-Saharan African economies and employing a system generalized method of moments (GMM) estimator, found a positive impact of institutional quality on human capital development because quality institutions of the countries stimulate healthcare, education, and public goods accessibility that promotes the human capital development. In line with this, employing the same GMM estimator and considering 49 sub-Saharan African economies, another study revealed that institutional quality dimensions—control of corruption, political stability, and government effectiveness—enhance educational accessibility that fosters human capital (Ouedraogo et al., 2022).

Many studies demonstrated that institutional quality improves human capital (Fagbemi et al., 2022; Kamalu & Wan Ibrahim, 2022). The study revealed that institutional quality might be crucial to promoting human development via foreign direct investment in the economy (Thi Cam Ha et al., 2023). Dias & Tebaldi (2012) also showed that institutional quality could foster human capital accumulation, enhancing economic growth. Fomba et al. (2023) found that institutional quality positively impacted educational achievement. Similarly, institutional support was needed to innovate and produce knowledge (Boudreaux, 2017; Kwan & Chiu, 2015). Based on these reviewed studies, institutional quality may be crucial to human capital formation. The study thus hypothesizes the following relationship as

H_3: Institutional quality positively affects the human capital development.

Data and Methods

Data Description and Sources

The study applied quantitative research design. The study used the time series spanning from 1980 to 2018 due to the availability of data and intended to cover the age of economic liberalization and globalization in Nepal (Banskota, 1996; Dahal, 1999). The study used secondary-level enrollment as proxied for human capital($\ln H$) (Barro & Lee, 2013; Gajurel, 2023; Ibrahim & Sare, 2018; Mincer, 1981), a targeted variable, obtained from World Development Indicators (WDI) World Bank database. Similarly, economic globalization (such as integrating trade and financial globalization) and social globalization (such as integrating interpersonal globalization, informational globalization, and cultural globalization) were taken as the two proxies for globalization ($\ln EG$ and $\ln SG$) obtained from KOF Swiss Economic Institute (de Oliveira & Moutinho, 2022; Gygli et al., 2019; Sangha & Riegler, 2020; Yameogo et al., 2023). Furthermore, as governing authority qualities, institutional quality ($\ln IQ$) was

proxied by the polity2 score (Digdowiseiso, 2022; Kunawotor et al., 2020; Marshall & Gurr, 2020) obtained from polity5 project of the Centre for Systemic Peace (CSP). Moreover, other control variables—GDP per capita (ln*Y*), capital formation (ln*K*), inflation (lnπ), financial development (ln*FD*), and labor forces (ln*L*)—were considered in this paper. All the series were transformed into a natural logarithmic form and the missing data of the respective series were interpolated. Furthermore, to address the frequency issues, the annual series was transformed into a quarterly form, using quarterly sum interpolation techniques (Adebayo et al., 2022; Gajurel et al., 2022). The descriptions of variables, their proxies, measurements, and sources are presented in Table 1.

Table 1

Description of Variables

Variables	Proxies	Description	Unit	Source
ln*EG*	Economic globalisation	Combination of trade globalization and financial globalization[1]	Index ranging from 1 to 100	KOF (2023), Gygli et al., (2019)
ln*SG*	Social globalisation	Combination of interpersonal globalization, informational globalization, and cultural globalization[2]	Index ranging from 1 to 100	KOF (2023); Gygli et al., (2019)
ln*IQ*	Institutional quality	The governing authority qualities, and a higher value indicate the more democratic institutions	Annual score ranging from -10 to + 10	CSP (2020); Marshall, & Gurr (2020)
ln*Y*	GDP per capita	Gross domestic product is divided by midyear population and data are expressed at constant 2015	US$	WDI (2023)
ln*K*	Fixed capital formation	Enhancements to land; acquisition of plants, machinery, and equipment; and the construction of infrastructure such as roads, railways, schools, offices, hospitals, residential homes, and commercial and industrial buildings.	% of GDP	WDI (2023)
lnπ	Inflation	Annual percentage change in the consumer price index estimated by Laspeyres formula	% annual	WDI (2023)
ln*FD*	Financial development	Domestic credit to private sectors	% of GDP	WDI (2023)
ln*H*	Human capital	Secondary level school enrollment	% gross	WDI (2023)
ln*L*	Labor forces	total population between the ages 15 to 64	number	WDI (2023)

Note. KOF = Konjunkturforschungsstelle, CSP = Centre for Systemic Peace, WDI = World Development Index

Model Specification

To begin with, the paper investigated the stationarity of series and stability and nonlinearity properties of the estimation before employing Markov regime-switching analysis. Nepal's political regimes were shifted from the 1990s and faced many ups and downs in the system. After the 1980s, there were several changes in policies, administrative qualities, human resources draining, and outcomes of global socioeconomic integration with neoliberalism policy in Nepal. Thus, the paper is intended to examine the regime-shifting effects on human capital of globalization and institutional qualities in Nepal.

The early seminal work of Quandt (1958) initiated the regime-switching regression model and was further elaborated by Goldfeld and Quandt (1973). It was popularized by Hamilton (1989) with the empirical regime-switching macroeconomic study of the

[1] See structure of economic globalization: https://ethz.ch/content/dam/ethz/special-interest/dual/kof-dam/documents/Globalization/2022/KOFGI_2022_structure.pdf

[2] Ibid.

nonstationary GNP series in the United States. Markov switching models introduce time-varying parameters based on state-specific values governed by a discrete latent stochastic process with limited memory, allowing for the estimation of state occurrence probabilities and state-specific parameters, thereby enhancing interpretation and forecasting through persistent regimes and their characteristics (Song & Woźniak, 2020). Thus, unlike models of structural changes that allow only occasional and exogenous shifts, the Markov switching model permits frequent, random changes, making it ideal for describing correlated data with distinct dynamic patterns across different periods (Kuan, 2002).

The study employed the Markov regime-switching approach to examine the impact of globalization and institutional quality on human capital development in Nepal under different regimes, motivating as political and administration shifts in Nepal. The paper applied two states or regimes Markov regime-switching models MS(2)—Regime 1 and 2—refer to the low and high human capital development states, respectively, reflecting the consequences of civil war, political regime changes, structural reforms, neoliberalism, and educational policy initiatives. Following Hamilton (1989)—recently employed by Khurshid et al. (2023), Tesfamichael and Shiferaw (2019), and Rahman et al. (2020)—the standard Markov regime-switching model with switching variance and means is obtained by:

$$Y_t = \phi_{S_t} + \xi_{S_t} X_t^{'} + \varepsilon_t; \qquad t = 1, 2, \ldots, T$$

where Y_t is the dependent variable ($\ln H$), $X_t^{'}$ is the transpose of regressors or regime variant variables X_t, S_t = state or regime, indicating latent variable, ϕ_{S_t} = intercept while in state S_t, ξ_{S_t} is the coefficient of regressors, and ε_t is error terms. It is assumed that coefficient vectors ξ and error term ε_t are independently and identically distributed (iid) random variables. Now, the two regimes or states (number in subscript refers to the parameters of the respective regime) Markov switching can be expressed as (Tesfamichael & Shiferaw, 2019)

$$Y_t = \begin{cases} \phi_1 + \xi_1 X_t + \varepsilon_{t,1};\ \varepsilon_{t,1} \sim N(0,\sigma_1^2) \text{ for } S_1, \\ \phi_2 + \xi_2 X_t + \varepsilon_{t,2};\ \varepsilon_{t,2} \sim N(0,\sigma_2^2) \text{ for } S_2 \end{cases}$$

Similarly, in the Markov switching model, p_{ij} refers to a transition probability matrix of the switching regime from the starting regime at t-1 to the landing regime at t; and the summation of those probabilities, $\sum_{j=1}^{2} p_{ij} = 1$ for i and j = 1, 2 that controlled switching between two states of regimes is given by

$$P = \begin{bmatrix} p_{11} & p_{12} \\ p_{21} & p_{22} \end{bmatrix}; \qquad \text{where } p_{ij} = P(S_t = j \mid S_{t-1} = i)$$

Results and Discussion

Test of Stationarity

Preliminarily, before the Markov regime-switching model (MSM), the unit root test for series non-stationarity was performed. Employing MSM, however, traditional unit root tests (URTs) are less powerful regarding structural breaks for regime switching (Nelson et al., 2001); therefore, the paper employed Zivot and Andrews (ZA) test (Zivot & Andrews, 1992). The augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1979, 1981) and the Phillips and Perron (1988) tests were employed for testing the null hypothesis of having a unit root in the series.

Table 2

Results of ADF and PP Unit Root Tests

Variables	Augmented Dickey-Fuller test (ADF)				Phillips–Perron test (PP)			
	At level		At Δ		At level		At Δ	
	C	C & T	C	C & T	C	C & T	C	C & T
ln*H*	-0.799	-2.249	-3.144**	-3.108	-2.326	-3.232*	-4.715***	-4.851***
ln*EG*	-2.165	-2.888	-2.937**	-2.995	-1.058	-1.676	-6.205***	-6.119***
ln*SG*	-0.757	-2.216	-1.806	-1.457	0.997	-2.324	-6.393***	-6.348***
ln*FD*	-0.549	-3.401*	-4.187***	-4.157***	-0.207	-2.699	-5.672***	-5.664***
ln*IQ*	-2.526	-3.128	-3.568***	-3.578**	-2.508	-2.627	-5.963***	-5.921***
ln*K*	0.5464	-1.500	-2.552	-2.900	0.087	-1.303	-6.832***	-6.825***
ln*L*	-2.051	-1.155	-1.520	-2.717	-3.712***	-0.338	-1.710	-1.931
lnπ	-2.281	-2.335	-3.993***	-3.986**	-3.550***	-3.664**	-6.748***	-6.705***
ln*Y*	2.613	1.120	-2.394	-3.478**	1.520	-0.719	-6.152***	-6.341***

Note. C = with constant; C & T = with constant and trend; Δ = first difference; * indicates significant at 10%; **significant at 5%; and *** significant at 1%.

Table 2 shows the results of ADF and PP URTs. The ADF and PP results reported that all variables—ln*H*, ln*EG*, ln*SG*, ln*FD*, ln*IQ*, ln*K*, lnπ, and ln*Y*—except ln*L* appeared to be stationary at first difference, while Ln*L* was stationary at level with constant with PP test and not significant with ADF test.

Preliminary Inspections of Linearity

Nonlinearity and regime shifts are also accounted for in the Markov switching models (Hamilton, 1989). On the other hand, linear models cannot deal properly with the existence of nonlinearity because of changes in means and variance (Khurshid et al., 2023). Thus, before the application of MSM, the study explored the nonlinearity, non-stability, and structural breaks in the time series. Cumulative sum (CUSUM) and cumulative sum of squares as initiated by Brown et al. (1975) are sensitive to non-normality (Kennedy, 2008). CUSUM plots of recursive residuals are used to verify model assumptions like normality and homoscedasticity, and to detect issues such as regime changes, outliers, and omitted predictors, offering an alternative to ordinary residual plots (Galpin & Hawkins, 1984). The CUSUM test detects structural breaks by plotting the sum of recursive residuals against critical bounds (Edgerton & Wells, 1994), while the CUSUM-of-squares test does the same, using the cumulative sum of squared recursive residuals as a fraction of their total sum (Kennedy, 2008).

Figure 1

Stability Results of Linear Model

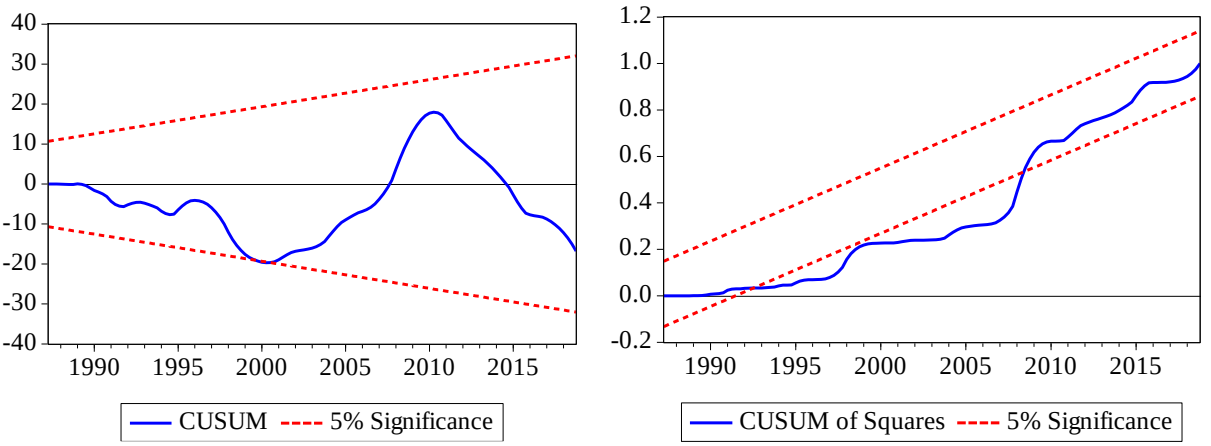
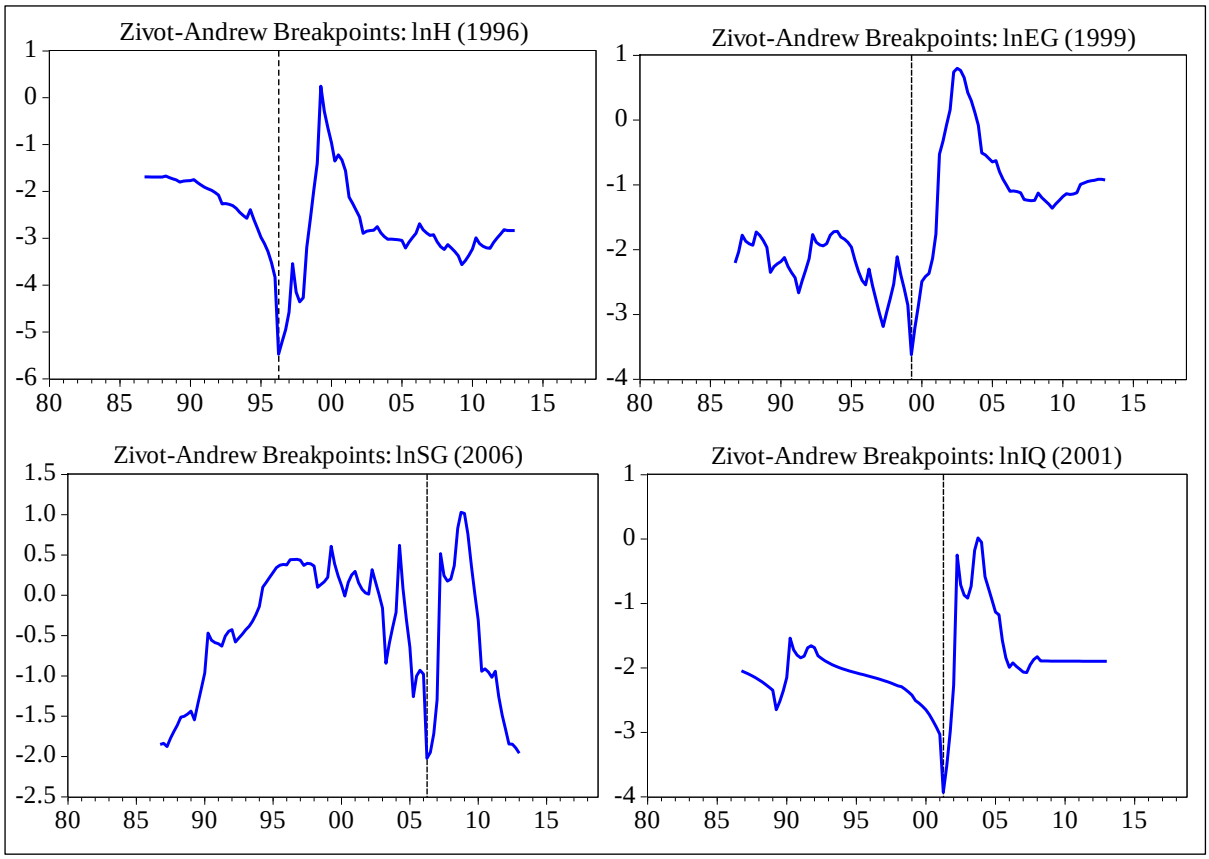


Figure 1 demonstrates the CUSUM) and CUSUM of square plots to test the nonlinearity of the linear model for the impact of globalization and institutional quality on human capital development in Nepal. In the figure, broken lines show the critical boundaries and the non-broken thick line shows the plot of recursive residuals. The CUSUM plot was not laid at a 5% critical boundary, indicating a structural break dated the fiscal year 2000, and thereby finding a nonlinearity in the model. Similarly, the CUSUM of the square, another powerful tool to test the nonlinearity, showed that multiple structure breaks prevailed and converged after the 2008 global crisis. The recursive residual plots thus confirmed that the linear model had not well stated and found structural brakes, nonlinearity, and switching properties in the time series.

Additionally, ZA URT was performed in this study to explore the structural breaks in the variables with the null hypothesis of the series having a unit root with a structural break in both the intercept and trend at maximum lags (k = 4). Zivot & Andrews (1992) modified Perron's URT, which originally required knowledge of a structural change at a specific point in time, into an unconditional URT. The ZA URT accounts for the breakpoint as endogenous (Altinay & Karagol, 2004). Figure 2 demonstrates the breakpoints as indicated by ZA URT.

Figure 2

Breakpoints of ZA URT of lnH, lnSG, and LnIQ



The ZA URT failed to accept the null hypothesis of having a unit root with a structural break at 1% level of significance, indicating variables—ln*H*, ln*SG*, and ln*IQ*—were stationary and had structural breaks. The ZA URT plots identified a structural break in each variable endogenously. The breakpoint of human capital development as a proxy of secondary enrollment was in 1996 when the Maoist insurgency had started and the school-age population declined sharply in Nepal (Manandhar, 1995). Similarly, in 1999 and 2006, structural breaks

were found in the socioeconomic globalization indicators of Nepal. Between these two periods 1999 to 2006, Nepal experienced massive devastating armed conflict. Furthermore, the structural break for institutional quality was in 2001. It was observed that the five-year term of local government officials concluded in July 2002, during a time marked by significant political turmoil, which included the royal massacre of June 2001, escalating Maoist insurgency, and rising threats and extortion (Gurung, 2011). The overall ZA URT results indicate that the linear model was unsatisfactory and a nonlinear model with structural changes in the economy should be considered.

Brock et al. (1987, 1996) developed a well-known test for nonlinearity named as BDS test. The BDS test, which employs the concept of the correlation integral from chaotic time series analysis, is commonly used to test whether a given time series consists of independent and identically distributed (iid) random variables (Tsay & Chen, 2018). Before Markov regime-switching analysis, many recent studies applied BDS test to inspect the spatial dependence and nonlinearity of the time series (Khurshid et al., 2023; Rahman et al., 2020; Uddin et al., 2018). The BDS test results are presented in Table 3.

Table 3

BDS Independence Test Resutls of lnEG, lnSG, and LnIQ

Dimension	ln*EG*			ln*SG*			lnIQ			Prob.
	BDS Statistic	Std. Error	z-Statistic	BDS Statistic	Std. Error	z-Statistic	BDS Statistic	Std. Error	z-Statistic	
2	0.194	0.005	35.593	0.204	0.004	47.297	0.187	0.004	44.310	0.00
3	0.326	0.009	37.580	0.344	0.007	50.554	0.306	0.007	46.747	0.00
4	0.417	0.010	40.160	0.441	0.008	54.795	0.385	0.008	50.648	0.00
5	0.478	0.011	44.040	0.508	0.008	61.046	0.434	0.008	56.032	0.00
6	0.520	0.011	49.523	0.554	0.008	69.697	0.460	0.007	63.203	0.00

It is observed that from Table 3, the BDS statistics for ln*EG*, ln*SG*, and ln*H* were statistically significant at 1% and failed to accept the null hypothesis of iid. The BDS test results confirmed that the relationship was nonlinear. Khurshid et al. (2023) thus stated that due to its effectiveness against switching models, the BDS test can be employed as a diagnostic tool to assess the validity of regime-switching models for identifying nonlinear time series. The study, therefore, allows us to employ the Markov regime-switching model for the nonlinear relationship between globalization and human capital development and institutional quality and human capital development in Nepal at different regimes.

Markov Regime Switching Analysis

Switching regime estimates help to remove discontinuities, allowing the function of one regime to smoothly transition into the function of the next regime during an adjustment period (Kennedy, 2008). The study applied the Markov switching model to examine the impact of socioeconomic globalization and institutional quality on human capital development in Nepal. The study estimated the 2 states or regimes MSM. Since the 1980s, Nepal experienced several dramatic political and administrative changes which was the motivation of the paper to investigate the effects of globalization and institutional quality on human capital development in Nepal. MSM analysis was divided into three different models as reported in Table 4. Model 1 estimated the impact of globalization (ln*EG* and ln*SG*) on human capital development (ln*H*); similarly, Model 2 examined the impact of institutional quality (ln*IQ*) on ln*H*; and finally,

Model 3 encompassed both ln*EG* and ln*SG* and ln*IQ* and determined the effect of them on human capital development.

The significant intercept terms or mean values of both regimes indicated the substantial dynamics in both regimes. The results indicated that in Regime 1, Model 1 had a higher mean value or intercept coefficient (C =0.001359) and lower variability (log(σ) = 6.700944) and among all models, Model 3 had lower volatility. Similarly, in Regime 2, Model 2 had a higher mean value (C = 0.001261) and Model 1 was highly volatile (log (σ) = 6.082474). Comparing both regimes, Regime 2 was less volatile than Regime 1. Moreover, the impact of globalization on the human capital of Regime 2 was less volatile than Regime 1. Likewise, the impact of institutional quality on the human capital of Regime 1 was less volatile than Regime 2. Finally, the impact of globalization and institutional quality on the human capital of Regime 1 was less volatile than Regime 2, but had a higher mean value. Overall results revealed that Regime 2 had thus high mean value and quite more variability, indicating periods of enhancing human capital as evident with Rahman et al. (2020). Thus, Regime 1 corresponded to low human capital and Regime 2 corresponded to higher human capital states.

Model 1 revealed that economic globalization (ln*EG*), excluding institutional quality (ln*IQ*), positively and significantly influenced the human capital (ln*H*) in both regimes. This result is consistent with the Nigerian context studied by Solarin and Eric (2015). However, social globalization (ln*SG*), ignoring ln*IQ*, negatively impacted human capital (ln*H*) in both regimes. In economic globalization, free movement of trade, FDI, and related policies and regulations are considered; whereas, social globalization covers interpersonal (tourism, student migration, telephone subscription), informational (use and access of internet, patents, technology, free press), and cultural (cultural goods, internal trademarks, gender parity, human capital, civil liberty) globalization (Gygli et al., 2019). The economic globalization enhances the country's trade openness and it can improve human capital through expanding public revenues for educational financing, technological and knowledge sharing, shifting of skill demand, and aware the essentials of education with this economic openness (Carnoy et al., 1999; Wang, 2012) across the regimes. However, Stewart (1999) found that globalization did not sufficiently level up the education system and thereby human capital development. In contrast, economic globalization may hinder human capital development in Nepal due to the international labor migration, brain drain, adversity of cultural aspect of conventional education, lack of quality publication, less skill achievements of formal education, and lower priorities on public education by the public. On the other hand, rising human investment and financing following globalization in the context of tourism, information, and cultural values have been identified by policymakers as a potential enhancer of human capital development in Nepal (Aryal, 2023; World Bank, 2020). Thus, social globalization may be due to facilitating the knowledge, skills, and cultural norms as increasing tourism, labor migration, remittance, internet, and social networking may positively influence the human capital of Nepal on the high side in shifting regime in Nepal. Olagunju et al. (2019) thus reported that globalization may narrow the poverty gap and child mortality which should enhance human capital stock in developing nations.

Table 4

Results of Markov Regime Switching Regression

Variable	Model 1 (ln*H*)	Model 2 (ln*H*)	Model 3 (ln*H*)
Regime 1			
dln*EG*	-0.043450**		-0.030777
	(0.021963)		(0.082531)
dln*SG*	0.143893***		0.158673
	(0.047960)		(0.100109)
dln*IQ*		-0.010800***	-0.009470***
		(0.002807)	(0.003510)
dlnπ	0.008090***	0.027989***	0.029374***
	(0.002886)	(0.005917)	(0.007578)
dln*L*	1.796565***	1.164156	1.365720
	(0.436593)	(1.118078)	(1.457483)
dln*K*	-0.014396	0.599590***	0.606678***
	(0.020886)	(0.075325)	(0.095725)
dln*FD*	-0.103053***	-0.168860***	-0.169647***
	(0.020317)	(0.041421)	(0.043097)
dln*Y*	-0.170676**	4.865891***	5.025056***
	(0.066451)	(0.295625)	(0.419292)
C (=μ)	0.001359**	-0.008958***	-0.010146***
	(0.000605)	(0.001432)	(0.002199)
log(σ)	-6.700944***	-6.135818***	-6.155374***
	(0.076896)	(0.100014)	(0.104441)
Regime 2			
dln*EG*	-0.170785**		-0.025286
	(0.073092)		(0.032212)
dln*SG*	0.193494*		0.104165*
	(0.107416)		(0.063039)
dln*IQ*		-0.004952***	-0.002870
		(0.001424)	(0.002104)
dlnπ	0.024045***	0.004155	0.006587**
	(0.007777)	(0.002863)	(0.003326)
dln*L*	-0.015071	1.845714***	1.865644***
	(1.467968)	(0.432865)	(0.437354)
dln*K*	0.496916***	-0.010878	-0.018275
	(0.095337)	(0.019305)	(0.020876)
dln*FD*	-0.173889***	-0.094582***	-0.094291***
	(0.046105)	(0.020019)	(0.020914)
dln*Y*	4.669488***	-0.150986**	-0.156668**
	(0.423467)	(0.061080)	(0.066844)
C (=μ)	-0.008418***	0.001261**	0.001209**
	(0.002255)	(0.000599)	(0.000612)
log(σ)	-6.082474***	-6.714483***	-6.715888***
	(0.103031)	(0.077848)	(0.078638)
Transition Matrix Parameters			
	3.584462***	3.110062***	3.084905***
P11-C	(0.647256)	(0.676685)	(0.689305)
	-3.065782***	-3.557540***	-3.574706***
P21-C	(0.684645)	(0.644286)	(0.653347)

Note. * indicates significant at 10%, **significant at 5%, and *** significant at 1%; standard error in parentheses

Model 2 found a statistically negative impact of ln*IQ* on ln*H* in both regimes, eliminating the globalization effects on the model. In contrast, Ouedraogo et al. (2022) revealed that institutional quality can improve access to education; in the same vein, Aljarallah (2019) found the short- and long-run impact of institutional quality on human capital; and Githaiga & Kilong'I (2023) revealed institutional quality was positive drives of human capital

development. However, the degree of adversity was lesser in Regime 2, indicating that regime shifting due to political, administrative, and educational causes may improve human capital through institutional quality in Nepal. ln*IQ* under this study measures the policy 2 index that measures the degree to which open, multi-party, and competitive elections select a chief executive who operates under comprehensive institutional constraints, and where political participation is competitive (Marshall & Gurr, 2020). Thus, as democratizing and distributing the power after the republic and federal movement and structural transformation, to some extent, institutional quality may be working for human capital development in Nepal. However, for all the growing voices and public awareness, corruption, political interferences, inefficient governance, lack of accountability and responsibility, lack of human capital development plan, excessive intervention by the local level in education, and inadequate investment in education and healthcare infrastructure may adversely influence the institutional quality on human capital development in Nepal.

Encompassing both institutional quality and globalization, Model 3 found that only ln*IQ* on ln*H* was statistically negative in Regime 1. However, only social globalization (ln*SG*) positively influenced the human capital (ln*H*) in Regime 2. These results provide an insight that social globalization, because of institutional quality, may enhance the human capital in a higher regime as in line with the empirical results of Congdon Fors (2017); however, with globalization, institutional quality may adversely impact the human capital in the first regime but not sufficiently in the shifted regime. However, economic globalization did not have any significant effects on human capital development in Nepal. Thus, globalization may enhance human capital in Nepal through social globalization by facilitating student and labor migration to the global market, providing sustainable income via remittances, promoting demonstration effects through global networking, enabling the transfer of skills and knowledge, supporting gender parity and civil liberties, and increasing policymakers' sensitivity to human capital investment in changing regimes. However, the institutional quality of Nepal was still unsatisfactory and not able to cope with the changing dimensions of human capital development.

Moreover, inflation (lnπ), a switching regressor positively influenced the human capital in all models and regimes except Regime 2 of Model 2 with globalization or institutional quality or both. These results imply that inflation may encourage and incentivize individuals to finance education, skills, and knowledge to cope with the changing and dynamic situation that may hinder survival in the competitive world. The results were consistent with Heylen et al. (2003) assumed that due to inflation, investing and working with physical capital were less beneficial and had less attention, promoting human capital activities.

Similarly, there was a significant and positive impact of labor forces (ln*L*) on human capital in Regime 1 of Model 1 with globalization, Regime 2 of Model 2 with institutional quality, and Regime 2 of Model 2, considering both globalization and institutional quality. This implies that growing labor forces can foster human capital in the higher human capital development regime. On the other hand, the results also revealed that capital (ln*K*) had a positive impact on human capital in Regime 2 of Model and Regime 1 of both Model 2 and Model 3. With increasing labor forces and the physical stock of capital, human capital can be induced from the opportunities to acquire skills and knowledge and finance to education. Labor force participation (Al-Zyoud, et al., 2021); labor migration (Contreras, 2013); remittance

(Azizi, 2018); and physical infrastructure—ICT, transport, and internet—(Acheampong et al., 2022) may also mount pressure on the government and individuals to finance humans.

Furthermore, financial development (ln*FD*) negatively influenced the human capital in all regimes of all models whether concerning the institutional quality or globalization. The finding was in contrast with Akhmat et al. (2014). It is due to less priority on financing education and health as well as in other skills projects that human capital may not be promoted no matter whether considering globalization or institutional quality in Nepal. Eventually, there was a positive effect of a per capita GDP (ln*Y*) on human capital in Regime 2 of Model 1, and Regime 1 of Model 2 and 3. However, per capita GDP or economic growth negatively influenced the human capital in Regime 1 of Model 1, and Regime 2 of Model 2 and 3. The negative impact is consistent with Akhmat et al. (2014) and the positive impact is consistent with Hong Vo et al. (2021). These mixed results revealed that globalization and institutional quality were not sufficient for the nexus of growth-human capital accumulation; however, there was some evidence that the growth of Nepal after some administrative and political movements can promote human capital development of Nepal.

The overall study thus concluded that economic globalization adversely influenced human capital, social globalization positively impacted human capital, and institutional quality was negatively associated with human capital development in Nepal. Out of the three hypotheses, thus, the first H_1—economic globalization positively influences the human capital—was rejected, the second H_2—social globalization positively influences the human capital—was accepted, and the third H_3—institutional quality positively influences the human capital—was rejected.

Transition Probabilities of Two Regimes

The transitional probability p_{ij} denotes the chance that state or regime *i* will be followed by the state or regime *j* (Hamilton, 1994). Transition matrix parameters in Table 4 revealed that switching regressors—globalization, institutional quality, and their combination—positively influenced the human capital in Regime 1 and negatively in Regime 2. Hence, according to Model 1, the likelihood of improving human capital as globalization was greater than deteriorating human capital development as a retardation in globalization. However, by Model 2, improving human capital by increasing globalization was lower than worsening human capital by decreasing institutional quality. Furthermore, by Model 3, the transition matrix parameters revealed that improving human capital by improving institutional quality and globalization was less than decreasing in human capital as decreasing in institutional quality and globalization. The transitional probabilities of shifting regime to regime for all models and expectation durations are presented in Table 5.

Table 5

Markov Transition Probabilities and Expected Duration

Probabilities	Model 1		Model 2		Model 3	
P_{11}	0.972998		0.957306		0.956266	
P_{12}	0.027002		0.042694		0.043734	
P_{21}	0.044541		0.027719		0.027260	
P_{22}	0.955459		0.972281		0.972740	
Expected durations						
Regimes →	1	2	1	2	1	2
All periods	37.03	22.45	23.42	36.08	22.87	36.68

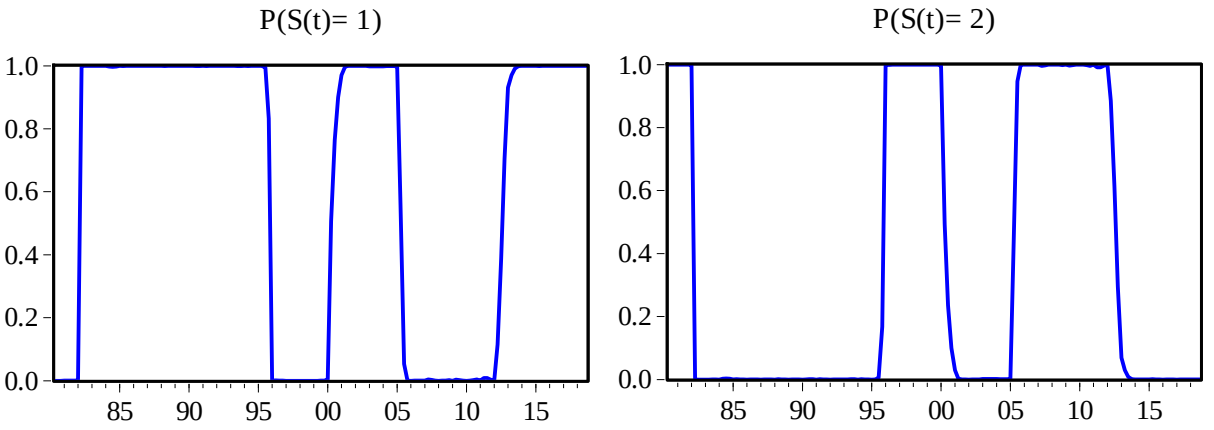
The transitional probability shows the time-varying state dependency or probability of switching from one regime to another. The higher probability values of P_{11} and P_{12} for all models failed to reject the null hypothesis of no shifts in the regime, and thus it confirmed a regime shift. The results of Model 1 revealed that transition probabilities from Regime 1 to Regime 2 (0.972998) were more prevalent or higher than Regime 2 to 1, (0.955459), suggesting that the recovery variable requires a longer period (37.03 quarters) than the stagnant variable (Phoong et al., 2020). Similarly, in Models 2 and 3, transition probabilities from Regime 1 to 2 were less prevalent or less than those from Regime 2 to 1, implying the recovery variable requires a shorter period (23.42 quarters and 22.87 quarters) than the stagnant variable.

Markov Switching Smooth Regime Probabilities

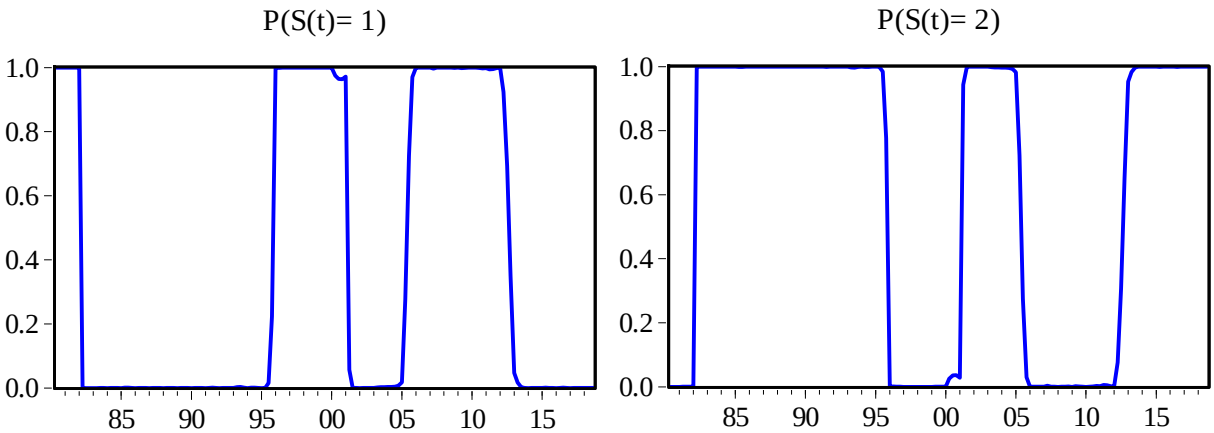
The regime-switching from low to high human capital smoothing probabilities from one state or regime to another for three models are plotted in Figure 3. It might also be necessary to assess the changes over time across different regimes and the smoothed probabilities during the transition period (Khurshid et al., 2023). This smoothing probability plot shows the standard deviation and mean of the transition probabilities and expected duration (Javari, 2021) for the human capital development of Nepal considering the original and predicted.

Figure 3

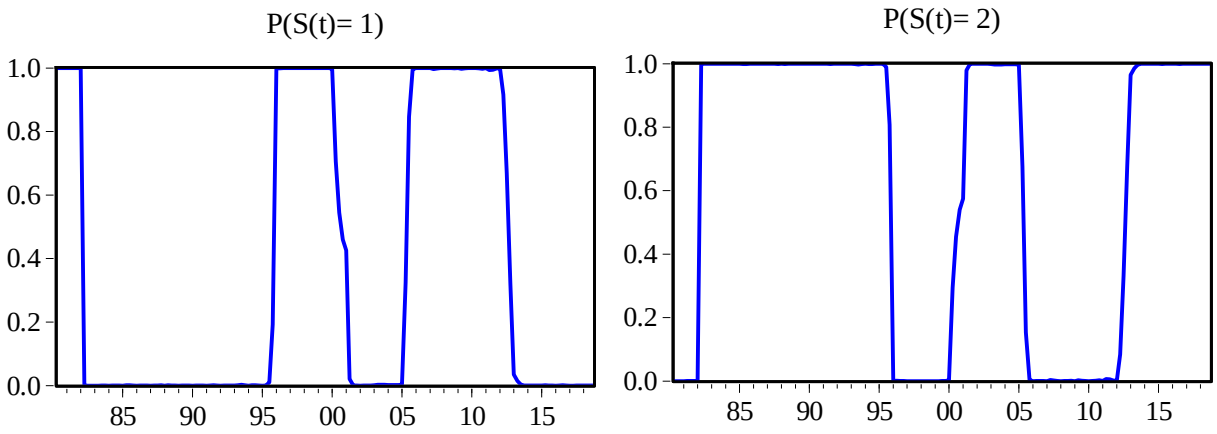
Markov Switching Smoothed Probabilities of Two Regimes or States



Model 1: Markov Switching Smoothed Regime Probabilities



Model 2: Markov Switching Smoothed Regime Probabilities



Model 3: Markov Switching Smoothed Regime Probabilities

Smoothing probabilities in Model 1 demonstrated that the Regime 1 points implied the years 1982-1996, 2000 -2005, and 2012-2018. Similarly, Regime 2 points covered the years 1980-1982q2, 1995q3-2001q2, and 2005-2013q3. Furthermore, according to Model 2, the periods covered by Regime 1 points were 1980-1982q2, 1995q2-2001q3, and 2004q3-2013q3; and Regime 2 points were 1982-1996q1, 2000-2006q1, and 2012-2018. Finally, Model 3 reflected that Regime 1 points covered 1980-1982q2, 1995q2-2001q3, and 2005-2013q3; and Regime 2 points included 1982-1996q1, 2000-2005, and 2012-2018.

Conclusion and Implication

The study examines the impact of socioeconomic globalization and institutional quality on human capital development in Nepal. The study employed a two-state Markov regime-switching model MS(2), with quarterly form interpolated data from 1990 to 2018. Before MS(2), ZA unit root tests confirmed the structural breaks in the variables' series, CUSUM and CUSUM of square also indicated that the linear model was not stable and offered an insight into the nonlinear properties prevailed in the estimation, and finally, BDS tests further revealed a nonlinear relationship between anticipated estimations. MS(2) thus was best to study the impact of socioeconomic globalization and institutional quality on human capital in Nepal in different regimes—low to high human capital development states.

The results of the globalization-human capital nexus revealed that economic globalization negatively and social globalization positively influenced the human capital development in Nepal (Model 1). After regime switching, social globalization—not economic globalization—improved notwithstanding. Considering globalization, inflation positively impacted, and financial development negatively influenced human capital. Additionally, labor and capital positively impacted the human capital in Regime 1 and Regime 2 respectively. However, GDP per capita was negative in the first regime and positive in the second regime. Thus, the result indicates that social globalization, not financial development, is crucial for human capital development; and capital, economic growth, and inflation with globalization can promote human capital even in Regime 2.

Moreover, according to Model 2, institutional quality adversely influenced human capital; however, the effect was lower in Regime 2. Considering institutional quality, inflation, capital, labor, and per capita GDP promoted human capital in Nepal. However, financial development in all regimes and per capita GDP in the second regime adversely influenced human capital development in Nepal. The results thus revealed that institutional quality was

deteriorating human capital development, and growth and financial development did not support human capital development in Nepal.

Finally, taking both institutional quality and globalization into consideration, in the same vein, institutional quality adversely influenced human capital development in regime 1, but social globalization positively impacted the human capital after regime changes in Nepal. However, inflation, capital (regime 1), economic growth (regime 1), and labor (regime 2) positively influenced human capital; on the other hand, financial development (both regimes), and economic growth (regime 2) adversely impacted the human capital in Nepal. Thus, overall findings revealed that institutional quality was not sufficient for human capital development and only social globalization could promote human capital in Nepal.

The overall study confirmed that social globalization can promote human capital in Nepal. However, institutional quality stifles human capital development in Nepal. On the other hand, economic globalization either adversely influences or does not significantly contribute to human capital development in Nepal. Similarly, in all models, financial development severely hampers but inflation improves the human capital development in Nepal. For human capital development, these results offer an insight into the quality of our institutions that needs to be improved in the globalized context in Nepal, thereby enhancing the private sector's financing and reducing the crowded-out problems as stimulants of government spending and policy switching. Thus, the policy implication of the research is that Nepal should focus on improving institutional quality and fostering social globalization while mitigating the negative effects of economic globalization and financial development to enhance human capital development.

Limitations and Scope for Future Research

This study has considered the KOF globalization index as the proxy for globalization. On the other hand, institutional quality was used as a proxy by Policy V project policy score. However, other alternative proxies for these variables can produce different results. The study also applied the regime-switching techniques, and data were interpolated quarterly. Thus, model specification, limited observation, limited control variables, and the possibility of alternative proxies are some limitations and delimitations of the study; in future work, comprehensive and impactful results can be drawn, considering these limitations. Thus, future studies might explore a linear model with different dimensions of globalization and alternative governance indicators as institutional quality to examine the wider coverage of health and educational dimensions of human capital development in Nepal.

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Appendix

Level Data of Variable Under Study

Year	EG	SG	IQ	Y	I	π	FD	H	L
1980	13.30	12.31	-9	333.205	15.76378	14.6845	8.573937	14.89753	8668587
1981	12.28	12.32	-2	352.6517	15.74322	11.14486	9.190318	17.53535	8869187
1982	11.93	12.40	-2	357.532	17.63586	11.69855	8.631729	20.17317	9072329
1983	12.65	12.36	-2	338.7322	19.47867	12.37724	8.095972	22.24095	9285730
1984	11.65	12.26	-2	362.8352	17.53491	2.845785	8.48591	23.68123	9499961
1985	13.56	12.39	-2	376.3713	20.84317	8.052641	9.852316	25.33503	9707480
1986	14.59	12.38	-2	384.8586	18.16811	18.99895	10.58162	26.9264	9910071
1987	16.95	12.65	-2	383.0707	19.50864	10.75033	10.45158	28.24066	10101100
1988	18.09	12.74	-2	403.8603	19.92172	8.983003	11.78621	29.15873	10290041
1989	17.33	13.02	-2	412.0073	18.12051	8.846887	13.04865	30.789	10502814
1990	18.61	12.56	5	420.7431	16.12033	8.2397	12.80866	31.92157	10756328
1991	18.70	13.49	5	436.1042	18.4005	15.55745	13.35385	33.88475	11046371
1992	22.93	14.49	5	441.4822	19.17108	17.14952	13.41832	36.45404	11385101
1993	23.93	14.59	5	446.2935	21.21902	7.505394	14.5731	37.7507	11712441
1994	26.04	14.00	5	471.2743	21.09278	8.349287	18.55012	38.15711	12004467
1995	29.60	15.00	5	476.4532	22.06912	7.62297	22.83144	39.96888	12285280
1996	26.16	15.95	5	491.3028	22.53036	9.220467	23.19776	42.90795	12547526
1997	27.19	16.24	5	505.7744	21.67244	4.009989	23.88507	39.57324	12817467
1998	25.18	16.63	5	511.053	21.73046	11.24447	28.66308	36.23853	13094652
1999	27.46	18.43	6	523.8826	19.08249	7.451113	28.87595	32.90382	13375707
2000	24.60	19.18	6	546.9316	19.32182	2.47882	30.67062	34.15637	13651335
2001	20.58	20.55	6	564.0754	19.19512	2.688304	29.41591	37.11553	13926230
2002	18.86	22.21	-6	556.3682	19.56478	3.029399	22.8689	40.76898	14201723
2003	19.69	23.03	-6	570.4196	19.92418	5.707009	26.14257	41.93066	14469885
2004	22.06	25.99	-6	589.7576	20.34117	2.841811	27.09733	43.57476	14727925
2005	22.51	26.29	-6	603.7488	19.94174	6.836333	28.72615	45.21885	14970294
2006	26.21	28.17	6	618.5593	20.72089	6.920336	33.15139	42.84846	15193345
2007	28.65	33.78	6	635.0001	21.06778	2.269219	37.28151	42.56725	15404452
2008	26.78	35.92	6	669.5565	21.87755	9.90783	51.65265	48.64606	15618218
2009	27.46	38.36	6	696.1428	21.35434	11.09482	59.17845	49.93654	15835198
2010	25.86	38.59	6	726.0553	22.20773	9.326504	54.58999	56.34319	16056222
2011	24.69	41.55	6	748.0125	23.98239	9.227075	46.42465	59.7314	16251872
2012	24.85	41.86	6	781.1039	23.99041	9.45981	48.75435	64.07684	16397960
2013	25.73	43.34	6	807.1369	24.73023	9.040163	50.46227	66.36922	16519935
2014	28.06	44.29	6	853.1481	25.25208	8.364155	54.46705	68.13395	16665345
2015	27.22	45.05	6	882.3077	27.55381	7.868909	56.90827	68.92825	16873900
2016	30.27	45.88	6	878.1504	28.70522	8.790343	69.8408	71.8179	17172370
2017	29.99	47.03	6	946.0426	30.57544	3.627096	69.18912	76.09621	17527080
2018	31.25	47.53	7	1006.607	32.43288	4.061163	76.32461	77.70651	17879134

Note. KOF (2023); CSP (2020); WDI (2023)