We shall study (locally trivial) holomorphic bundles over open sets in $\mathbb{C}$ with fiber $\mathbb{C}^n$. We shall assume that the bundle is given by transition fiber automorphisms that are locally independent of the base point and that belong to a group $G$ of automorphisms of $\mathbb{C}^n$. Our goal is to extend such bundles to bundles defined over larger open sets in $\mathbb{C}$ and in fact over the whole Riemann sphere. For the extended bundles the fiber automorphisms will depend on the base point. As a corollary of our results one gets examples of holomorphic bundles on the unit disc (and $\mathbb{C}$) with fiber $\mathbb{C}^2$ and with gluing polynomial automorphisms that are non trivial and non Stein. This answers the last question in the Serre Problem on Stein bundles, left open after the counterexamples of Skoda, Demailly and Coere-Loeb.